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# **MCFSS**

## **Techniques and Procedures**

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**U.S. Marine Corps**

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DEPARTMENT OF THE NAVY  
Headquarters United States Marine Corps  
Washington, DC 20380-0001

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FOREWORD

1. PURPOSE

Fleet Marine Force Manual (FMFM) 6-18-1, *MCFSS Techniques and Procedures*, sets forth the techniques and procedures for employing the Marine Corps Fire Support System (MCFSS) within Fleet Marine Forces.

2. SCOPE

This manual is intended as a training and field reference for all personnel involved in automated fire support command and control. The automated techniques and procedures in this manual are based on those established in FMFM 6-18, *Techniques and Procedures for Fire Support Coordination*. This manual serves as an automated procedures supplement to FMFM 6-18 and is designed to be used with that publication.

3. SUPERSESION

None.

4. CHANGES

Recommendations for improving this manual are invited from commands as well as directly from individuals. Forward suggestions using the User Suggestion Form format to —

Commanding General  
Doctrine Division (C 42)  
Marine Corps Combat Development Command  
2042 Broadway Street Suite 210  
Quantico, Virginia 22134-5021

5. CERTIFICATION

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

A handwritten signature in black ink, appearing to read 'C E Wilhelm', written in a cursive style.

C. E. WILHELM

Lieutenant General, U.S. Marine Corps

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**USER SUGGESTION FORM**

**From:**

**To:** Commanding General, Doctrine Division (C 422), Marine Corps  
Combat Development Command, 2042 Broadway Street Suite 212,  
Quantico, Virginia 22134-5021

**Subj:** RECOMMENDATIONS CONCERNING FMFM 6-18-1, *MCFSS  
TECHNIQUES AND PROCEDURES*

1. In accordance with the Foreword to FMFM 6-18-1, which invites individuals to submit suggestions concerning this FMFM directly to the above addressee, the following unclassified recommendation is forwarded:

<u>Page</u>	<u>Article/Paragraph No.</u>	<u>Line No.</u>	<u>Figure/Table No.</u>
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2. Proposed new verbatim text: (Verbatim, double-spaced; continue on additional pages as necessary.)

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**Note:** Only one recommendation per page.

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## **Chapter 1**

# **MCFSS Employment**

The Marine Corps Fire Support System (MCFSS) automates fire support command and control functions by using digital devices and data communications to collect, process, and distribute information quickly and accurately. It incorporates systems already employed by the Marine Corps and employs their full data communications capability. These systems include the Battery Computer System (BCS), the Meteorological Data System (MDS), and the Firefinder Countermortar Radar (CMR). MCFSS also uses some new, off-the-shelf technology and U.S. Army systems such as the Initial Fire Support Automation System (IFSAS), which is Army Tactical Fire Direction (TACFIRE) System software ported to a Lightweight Computer Unit (LCU).

### **1001. Introduction to MCFSS**

MCFSS is an automated fire support system that has evolved from the Fireflex testbed.

#### **a. Background**

In 1963 the artillery launched its first effort toward automation with the fielding of the M18 Field Artillery Digital Automatic Computer (FADAC). This computer provided battery-center to center-of-target technical solutions for artillery of the time. Then in 1978 the Army began fielding TACFIRE, which automated tactical fire control. TACFIRE was an equipment heavy system and was not fielded to the Army's light divisions, National Guard, or Reserve. The TACFIRE program was subsequently ported into smaller computers as technology was developed in the 1980s. This system was referred to as Lightweight TACFIRE (Light TACFIRE or LTACFIRE) and was fielded to the Army's light divisions in battlefield computer terminals (BCT). In 1987 the Marine Corps initiated the Fireflex testbed, using Light TACFIRE and several other off-the-shelf software and hardware, with the intent of acquiring knowledge and expertise in automated fire support systems. In 1993 the Army began fielding IFSAS to the National Guard and Reserves. IFSAS is basically Light TACFIRE

ported into a modern ruggedized, off-the-shelf 80486 computers. IFSAS will also replace TACFIRE in Army heavy units and augment Light TACFIRE in light units.

#### **b. System Description**

MCFSS is an interim system for which the objective system is the Advanced Field Artillery Tactical Data System (AFATDS). The MCFSS is built around the following systems:

- The AN/GYG-1(V) Battlefield Computer Terminal with Light TACFIRE software for artillery fire direction centers (FDCs) at battalion and regimental level.
- The AN/GYK-37 Lightweight Computer Unit, with IFSAS software, at force fires coordination centers (FFCCs), fire support coordination centers (FSCCs), and other nodes.
- The AN/GYK-37 Lightweight Computer Unit with BCS software at the battery FDC.
- The AN/TPQ-36 (Q-36) Firefinder Countermortar Radar at the artillery regiment.
- The AN/TMQ-31 Meteorological Data System at the artillery regiment.
- The AN/PSC-2A Digital Message System (DMS) with artillery forward observers.

### **1002. Capabilities**

MCFSS significantly increases the efficiency of fire support available to maneuver commanders. It increases communications speed and accuracy without affecting command relationships or the doctrine, tactics, techniques, and procedures for fire support. MCFSS is made up of computers and related components which automate some command and control functions of fire support. These computers automate not only tactical and technical fire direction, but can process and disseminate —

- Conventional fire plans.
- Target information.
- Fire support coordination measures (FSCMs) and other battlefield geometry such as forward line of troops (FLOT) and unit zones.
- Firing unit and ammunition information.
- Meteorological and survey information.
- Fire missions generated by incoming target intelligence.

### **1003. MCFSS Principles**

The following principles are based on lessons learned during the Fireflex Testbed as well as lessons learned from 15 years of Army experience with TACFIRE.

**a. MCFSS is a system.** The MCFSS comprises many different computers and other devices. If the system is to operate smoothly and support the maneuver commander's operation, all devices in the system must operate on an integrated operating setup and communications scheme. If all elements of the system are not integrated, the *system will not work*. The basis for the integration of MCFSS is this publication and the unit's standing operating procedure (SOP).

**b. MCFSS does not replace the need for manual/voice backup.** Due to the complexity of MCFSS, the entire system will not be working at all times. MCFSS is dependent on solid communications which will not always be possible due to distances and interference. In these circumstances the unit must have manual backups in place to be able to accomplish the mission.

**c. MCFSS has an Achilles Heel — communications.** The most practiced procedures and the best running automated computers in the world will not allow MCFSS to work if they cannot communicate. The communications problem is twofold. First, communications parameters in all devices must be in agreement if they are to communicate. Settings at different devices on a net cannot be changed without notification of, and agreement from, the net control station (NCS). Second, time and attention must be paid to communications equipment used for data transmission.

**d. MCFSS sustainment training must be a priority.** MCFSS uses computers that are designed to be user friendly *but* they require constant operator training. The skills needed to operate the computers are *very perishable* and require continuous practice in order for an operator to maintain his proficiency. A unit's ability to integrate all elements of MCFSS is equally perishable. The Individual Training Standards (ITSs) should be used for the basis for operator and supervisor sustainment training. Unit sustainment training should be based on this publication and the unit's MCFSS SOP.

e. MCFSS is only a tool to be used to accomplish the mission. If a task can be done faster and easier by manual methods, do not force MCFSS to work at the expense of the timely execution of your unit's mission. During exercises, this must be balanced with the requirement for sustainment training.

#### **1004. Interoperability**

MCFSS is interoperable with the following systems:

- Army TACFIRE, Light TACFIRE, and IFSAS.
- Multiple Launch Rocket System (MLRS) Fire Direction Systems (FDS).
- AFATDS.
- Army Ground Station Module (AGSM). The AGSM is a computer that receives combat intelligence from the Air Force's joint surveillance, target attack radar system (JSTARS) aircraft.
- Lightweight Ground Station Module (LGSM). The LGSM is the vehicle-mounted variant of the AGSM.
- Airborne Target Handover System (ATHS). The ATHS is found in Army OH-58D aircraft.
- Artillery automated data processing (ADP) systems of other nations under NATO standard agreement (STANAG) 5620.

## **Chapter 2**

# **Fire Support Communications**

### **2001. General**

The ability of FFCCs, FSCCs, and FDCs to perform their missions depends on reliable communications. Fire support and artillery communication nets provide voice and data communications over frequency modulation (FM), high frequency (HF), wire, and multi-channel equipment. Voice and data transmissions are not compatible on the same net unless the voice operators are well trained in this procedure. Voice communications on a data net should be limited to initially establishing and reestablishing communications, and when operations are degraded. The fire support communication net structure optimizes the capabilities of available digital data devices while maintaining a voice capability. The depicted communications architecture is different from the previous voice-only communications architecture. The function and names of some nets may differ significantly from those previously used.

### **2002. Data Communications Nets**

#### **a. Marine Expeditionary Force (MEF) Force Fires Coordination (MEF FFC) Net**

**(1) Purpose.** The MEF FFC Net provides a means for overall coordination with all major command elements of the MEF or MEF (forward) [MEF(F)].

#### **(2) Composition**

- MEF or MEF(F) FFCC (NCS)
- Supporting Arms Coordination Center (SACC)
- Subordinate Marine Expeditionary Unit (MEU) FFCC
- Division FSCC(s)
- Rear Area Operations Center (RAOC)
- Adjacent units

**b. MEU Force Fires Coordination (MEU FFC) Net**

(1) **Purpose.** The MEU FFC Net provides a means for overall coordination with all major command elements of the MEU.

**(2) Composition**

- MEU FFCC (NCS)
- SACC
- Battalion FSCC(s)
- RAOC
- Adjacent units
- Artillery battery FDC

**c. Division Fire Support Coordination (Div FSC) Net**

(1) **Purpose.** The Div FSC Net provides a division level data net for fire support coordination and planning. The net provides a means to exercise command and control data and for the dissemination of tactical information and reports for all agencies of the division FSCC, including air and naval gunfire. Data communications between the division FSCC and battalion FSCCs is available via relay at the regimental FSCC if required.

**(2) Composition**

- Division FSCC (NCS)
- Artillery regiment FDC
- Infantry regiment FSCC
- Direct Air Support Center (DASC) (If DASC is collocated with the division FSCC, communications are established via wire.)
- Target processing center (TPC) via relay through the artillery regiment FDC

**d. Artillery Regiment Fire Direction (Regt FD) Net**

(1) **Purpose.** The Regt FD Net is the tactical fire direction data net used by the artillery regiment to transmit orders, fire missions, tactical information, fire planning, and meteorological data to its battalions. The battalions use this net to request additional artillery support from the artillery regiment and to provide reports in data formats. When a separate

battalion fire direction net is not established, this net will also be used to request additional support from a reinforcing battalion. The net also provides the principal link between the artillery regiment and its battalions for collecting, exchanging, and disseminating combat information and intelligence.

## **(2) Composition**

- Artillery regiment FDC (NCS)
- Artillery battalion FDCs
- TPC via relay through the artillery regiment FDC

### **e. Regimental Fire Support Coordination (Regt FSC) Net**

**(1) Purpose.** The Regt FSC Net is the data fire support and coordination net for the infantry regiment. This net provides a means of exchanging tactical information between the regimental and battalion FSCCs and the supporting artillery battalion FDC. Message traffic related to fire planning is sent over this net. Though subscribers to the Regt FSC Net, battalion FSCCs and the supporting artillery battalion FDC do not communicate with each other on this net. Communications between the battalion FDC and the battalion FSCCs are accomplished on the conduct of fire nets.

## **(2) Composition**

- Infantry regiment FSCC (NCS)
- Artillery battalion FDC in direct support (DS) (also referred to as DS battalion)
- Maneuver battalion FSCCs

**NOTE:** All artillery battalions are organized to perform any of four tactical missions. Prefacing battalion with "DS" or another of the mission acronyms (GS=general support, R=reinforcing, GSR=general support-reinforcing) indicates its current mission, not its structure or capability.

### **f. Artillery Battalion Conduct Of Fire (COF) Nets 1, 2, 3 and 4 (COF 1/2/3/4)**

**(1) Purpose.** The battalion COF nets are the primary means for artillery forward observers to request and adjust artillery fire and to provide tactical

information to higher headquarters. Data COF nets function as a combination of COF and FD voice nets. One COF net is normally provided to each supported maneuver battalion. COFs 1 and 2 may be combined to create COF A, and COFs 3 and 4 may be combined to create COF B as dictated by the availability of communications equipment and the situation. Artillery forward observers (FOs), a firing battery FDC, and the battalion FDC are assigned to each net. Depending upon the degree of centralization of tactical fire control, the FO may send his call for fire to the artillery battalion FDC, or maneuver battalion FSCC. The COF nets must be uncluttered and responsive. The artillery battalion must control message traffic to prevent a proliferation of data messages that should be sent over other nets or by other means.

## **(2) Composition**

- Artillery battalion FDC (NCS)
- Maneuver battalion FSCCs
- Firing battery FDCs (NCS during MEU operations)
- Artillery FOs

## **g. Battalion Fire Direction (Bn FD) Net**

**(1) Purpose.** The data Bn FD Net is activated to provide a direct link between the DS battalion and its R battalion's FDC. This is an optional net with the primary method being communication between the DS and R FDCs on the Regt FD Net.

## **(2) Composition**

- DS artillery battalion FDC (NCS)
- R artillery battalion FDC
- Radars in DS of the artillery battalion
- MDS in DS of the artillery battalion

## **h. Meteorological Data/Radar Telling (Met/Rdr Tel) Net**

**(1) Purpose.** The Met/Rdr Tel Net links the TPC, the meteorological (met) platoon's met stations, and the counterbattery radar (CBR) platoon's radar sections. The TPC is equipped with a BCT/LCU and functions as a filter for target acquisition and meteorological data entering the system. The TPC operates in artillery target intelligence mode 3 (**ATI MODE 3**) and performs the targeting functions associated with counterfire planning.

**(2) Composition**

- TPC (NCS)
- Q-36 radar sections
- MDS/Meteorological Measuring System (MMS) stations
- Unmanned aerial vehicle (UAV) observer equipped with DMS (when controlled by the artillery regiment)

**i. TPC Wire Net**

**(1) Purpose.** The TPC Wire Net links the TPC to the collocated artillery regiment FDC. This wire net provides the TPC with its link to other stations by relay available through the regimental FDC device.

**(2) Composition**

- Artillery regiment FDC (NCS)
- TPC
- Division FSCC via relay through artillery regiment FDC
- Infantry regiment FSCCs via relay through the artillery regiment FDC
- Artillery battalion FDCs via relay (if required)

**j. Data Communications Guard Chart**

Figure 2-1 provides the net assignment of subscribers and the communications parameters for the operation of each net.

<b>LEGEND:</b> C=Net Control X=Guard R=Relay A=As Required	<b>MEF FFC Net</b>	<b>MEU FFC Net</b>	<b>Div FSC Net</b>	<b>Regt FD Net</b>	<b>Regt FSC Net</b>	<b>Bn FD Net</b>	<b>Bn COF Nets 1,2,3,4</b>	<b>TPC Wire Net</b>	<b>Met/ Rdr Tel Net</b>
MEF FFCC	C								
MEU FFCC		C							
Division FSCC	X		C					R	
DASC			X						
RAOC	X	X							
Regimental FSCC			X		C			R	
Battalion FSCC		X			X		X		
Regimental FDC			X	C				C	
TPC			R					X	C
DS Battalion				X	X	C	C		
R Battalion				X		A			
GS Battalion				X		A	C		
GSR Battalion				X		A	C		
Battery 1,2,3,4		A					X		
FO							X		
CBR Platoon						A			X
Met Platoon						A			X
UAV FO									A

Figure 2-1. Data Communications Guard Chart

**k. Reducing the Number of Operating Nets**

The stations operating the greatest number of data nets are at the regimental level and lower with the battalion FDC operating the most nets. Figure 2-2 displays the battalion FDC operating seven nets. This configuration requires two BCTs at the battalion FDC.

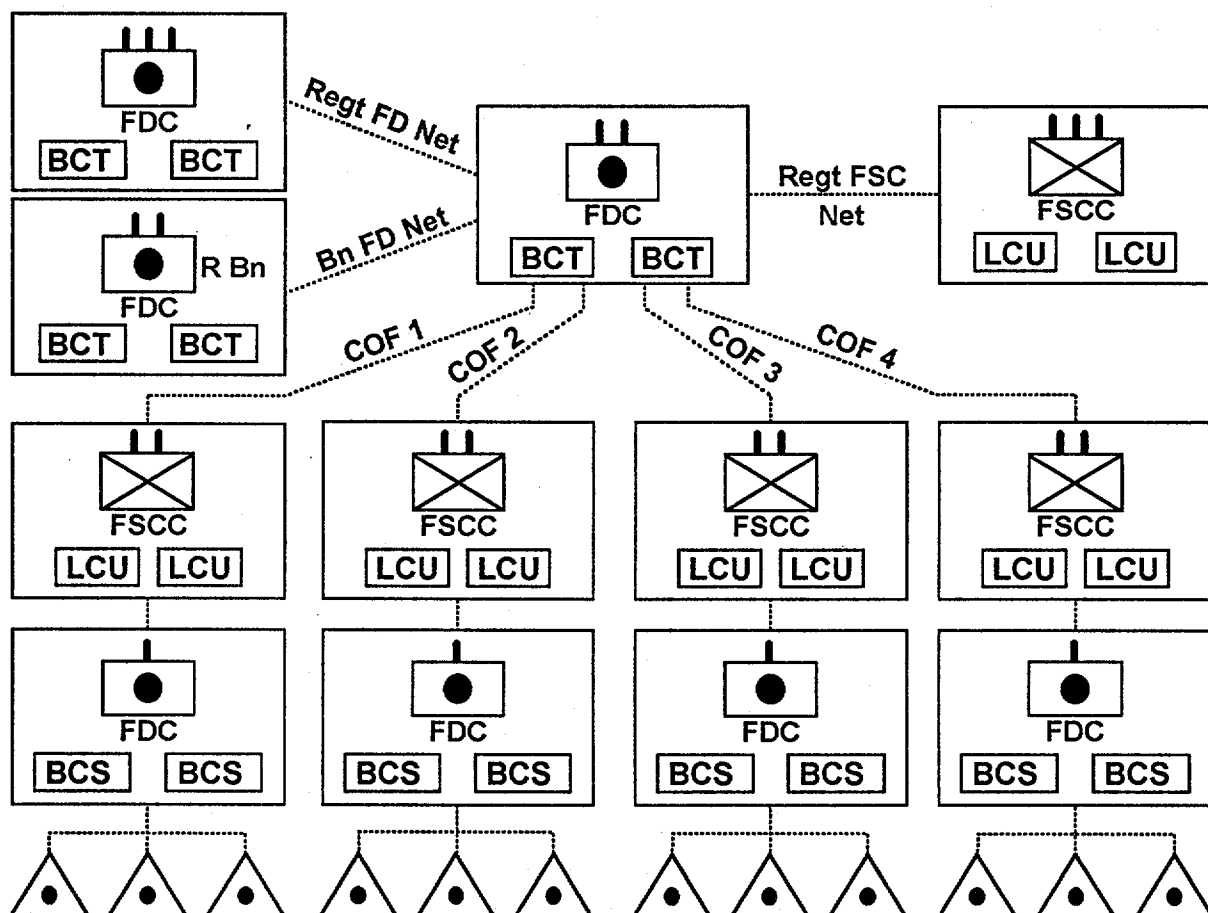


Figure 2-2. Battalion FDC Operating Seven Data Communications Nets

Figure 2-3 shows the same battalion FDC operating only four nets. Subscribers on COF 1 and 2 are combined to form COF A. Subscribers on COF 3 and 4 are combined to form COF B. The Bn FD Net is eliminated by moving the reinforcing battalion to the Regt FD Net.

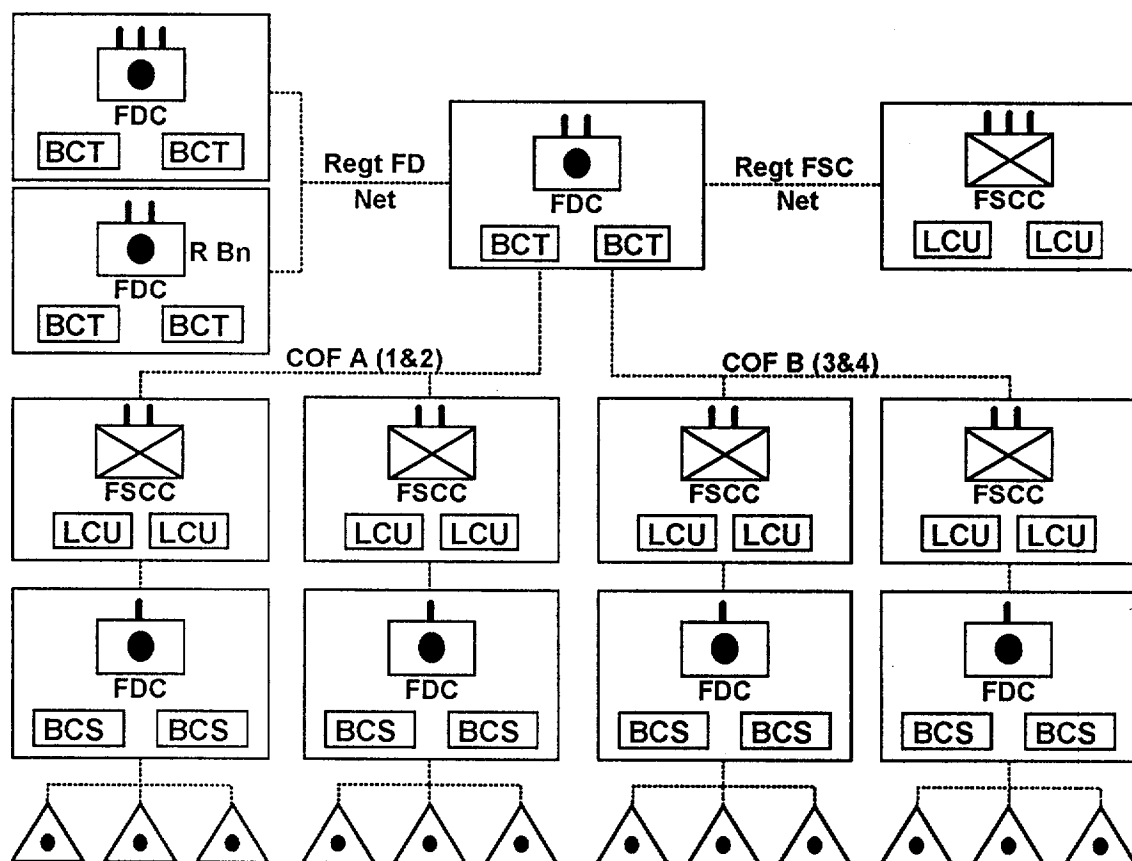


Figure 2-3. Battalion FDC Operating Four Data Communications Nets

## 2003. Communications Parameters

### a. Requirements

Communications parameters provide all stations with the necessary data to build and operate the nets. Refer to the appropriate equipment technical manuals for specific equipment requirements.

**b. Priority**

Net sensing and wait times establish the priority of stations for access to the data net. The higher echelons require higher priority (lower delay times) with net control station possessing the highest. Priority is further defined by the station's importance in the tactical environment.

(1) All devices except BCT and IFSAS LCU use one delay setting for all priority messages.

(2) BCT and IFSAS LCU use 4 settings corresponding to first and subsequent transmission attempts for messages of priority 1 through 4 or 5 through 8. This allows the builder of the net to assign a longer delay to lower priority messages and to further delay subsequent (and less likely to succeed) transmissions of the same message.

(3) To establish the correct settings, assign the net access for priority 1-4 messages (for all messages in devices other than the BCT or IFSAS LCU) based on the stations echelon and tactical mission.

(a) NCS has the highest priority.

(b) Stations of the same organizational level are ordered with the next higher number.

(c) The next lower organization is assigned the next higher number. For example, if battalion FDC is the NCS on a COF net, it is assigned a priority of 1. The battalion FSCC on the net is assigned 2, and the battery FDC 3.

(d) For BCTs and IFSAS LCUs, increase the value for subsequent transmissions by at least one. Make the first transmission of priority 5-8 messages equal to or one greater than priority 1-4 subsequent transmissions. Increase the value for subsequent transmissions by at least one.

**c. Data Rate**

All data communications devices are capable of transmitting data at specified rates measured in bits per second (bps). All MCFSS devices are capable of 600 or 1200 bps rates. The values are proportional; e.g., 1200

bps is twice as fast as 600 bps. BCT, DMS, and LCU are capable of other rates (1200, 4800, 8000, and 16,000 bps), which are dependent upon the use of single channel ground and airborne radio system (SINCGARS) radios. The communications planner at the NCS must be aware of the capabilities of the different devices and ensure that rates selected are compatible with devices assigned to the nets.

#### **d. Tone Pairs**

MCFSS devices transmit the data signals using a form of tone modulation called audio frequency shift keying (commonly called FSK) for the 600 and 1200 bps rates. SINCGARS rates use digital transmissions as well as FSK. The tone pairs used are either 1200/2400 hertz (Hz) or 1300/2100 Hz. The MDS and Q-36 are capable of 1200/2400 Hz only. When using VRC-12 series radios, the 1300/2100 Hz is the better selection for use with KY-57 encryption. However, 1200/2400 Hz provides better communications with SINCGARS radios.

#### **e. Keytime**

Keytime is the duration, in seconds, of the signal transmitted by the data device to power the radio to transmission level. Keytime is a requirement of the radio and is lengthened by adding additional communications devices; e.g., AN/GRA-39 remotes. In most computer devices the keytime also sets the duration of the time the device waits for a control message (**ACK** or **NAK**) before giving up the attempt as failed. The communication planner must determine the keytime required by the device with the longest keytime on the net and assign that to all devices on the net.

(1) Starting keytimes are determined by the equipment. A rough determination rule can be used. For VRC-12 series radios use 1.4 seconds; for SINCGARS radios use 0.7 seconds. Add 0.7 seconds for each additional piece of communications equipment that must be keyed; e.g., attaching an AN/GRA-39 increases the keytime by 0.7 seconds.

(2) Assign the highest keytime predicted for any station to all stations on the net.

## **2004. Subscriber Tables**

### **a. Responsible Agencies**

A number of variables affect the writing of the subscriber tables. These include the number of available communications assets (e.g., radios, frequencies, and batteries), number and type of MCFSS devices, task organization, and mission. The subscriber tables must be flexible enough to allow changes during the course of operations. The agencies responsible for producing and updating the subscriber tables must be intimately familiar with these requirements. Since no single agency in the MEF is required to communicate with and possess detailed, up-to-date knowledge of the communications situation on every net, no single station is able to produce the entire subscriber table. Hence, the production and update of the subscriber tables is decentralized. Each NCS is responsible for the subscriber tables for its nets. These subscriber tables will conform to the standardized procedures listed in this paragraph.

### **b. Standard Addressing**

NCSs conform to the system of standard addressing listed in the following figures. The addresses available are listed in the left most column. Each net is provided a column in the table with the net name in the heading. Locating the subscriber in the net column and indexing to the left yields the assigned address for any station. Blank entries for a net indicate an unassigned address available to the communications planner. The following special instructions apply to assigning addresses.

- (1) Special characters (& \* + - # ? .) cannot be assigned to fixed format devices or nets on which fixed format devices must communicate.
- (2) Addresses Q through Z must be reserved for fixed format relay addresses and not assigned.
- (3) Assigning message of interest (MOI) addresses to the BCT or LCU result in fire mission messages being received in an information only mode. Do not assign MOI addresses to these devices when establishing net setting. MOI addresses must be established for BCT and LCU subscribers in the subscribers table. Use the same address as the physical address extracted from the following figures.

c. MEF FFC Net, Div FSC Net, and Regt FSC Nets

Figure 2-4 provides standard addresses for the MEF FFC Net, the Div FSC Net, and the Regt FSC Net.

Address	MEF FFC Net	Div FSC Net	Regt FSC Net
A	MEF FFCC-Main		Regt FSCC-Main
B	1st Div FSCC-Main		Regt FSCC-Fwd
C	1st Div FSCC-Fwd		1st Bn FSCC-Main
D	2d Div FSCC-Main		1st Bn FSCC-Fwd
E	2d Div FSCC-Fwd		2d Bn FSCC-Main
F	3d Div FSCC-Main		2d Bn FSCC-Fwd
G	3d Div FSCC-Fwd		3d Bn FSCC-Main
H	MEF FFCC-Fwd		3d Bn FSCC-Fwd
I	RAOC-Main		4th Bn FSCC-Main
J	RAOC-Fwd		4th Bn FSCC-Fwd
K			Arty Bn FDC-Main
L			Arty Bn FDC-Fwd
M			
N			
O			
P			
Q			
R			
S			
T			
U			
V			
W			
X			
Y			
Z			

Figure 2-4. MEF FFC, Div FSC, and Regt FSC Nets Subscriber Table

Address	MEF FFC Net	Div FSC Net	Regt FSC Net
0		Div FSCC-Main	
1		Div FSCC-Fwd	
2		DASC-Main	
3		DASC-Fwd	
4		1st Infantry Regt FSCC-Main	
5		1st Infantry Regt FSCC-Fwd	
6		2d Infantry Regt FSCC-Main	
7		2d Infantry Regt FSCC-Fwd	
8		3d Infantry Regt FSCC-Main	
9		3d Infantry Regt FSCC-Fwd	
*		4th Infantry Regt FSCC-Main	
?		4th Infantry Regt FSCC-Fwd	
+		Arty Regt FDC-Main	
0		Arty Regt FDC-Fwd	
-			
#			
&			

Figure 2-4 (continued). MEF FFC, Div FSC, and Regt FSC Nets Subscriber Table

**NOTE:** A forward echelon (e.g., "Arty Regt FDC-Fwd") is formed from the equipment and staff of a unit's main echelon to enable it to displace in two increments and thus maintain continuous control of combat operations. The forward echelon should not be confused with the tactical echelon. For more information on command echelonment, see page 21 of FMFM 3, *Command Control*, and pages 1-5 and 9-3 of FMFM 6-9, *Marine Artillery Support*.

**d. Regt FD Net, TPC Wire Net, and Met/Rdr Tel Net**

Figure 2-5 lists the standard addresses for the Regt FD Net, TPC Wire Net, and Met/Rdr Tel Net. The addresses are laid to allow the Div FSC Net to be combined with the Regt FD Net.

Address	Regt FD Net	TPC Wire Net	Met/Rdr Tel Net
A	Arty Regt FDC Main	Arty Regt FDC Main	
B	Arty Regt FDC Fwd	Arty Regt FDC Fwd	
C	1st Arty Bn FDC Main		
D	1st Arty Bn FDC Fwd		
E	2d Arty Bn FDC-Main		
F	2d Arty Bn FDC-Fwd		
G	3d Arty Bn FDC-Main		
H	3d Arty Bn FDC-Fwd		
I	4th Arty Bn FDC-Main		
J	4th Arty Bn FDC-Fwd	TPC-Main	TPC-Main
K	5th Arty Bn FDC-Main	TPC-Fwd	TPC-Fwd
L	5th Arty Bn FDC-Fwd		CBR #1
M	MLRS Bn/Btry-Main		CBR #2
N	MLRS Bn/Btry-Fwd		CBR #3
O			CBR #4
P			CBR #5
Q			
R			
S			
T			
U			
V			
W			

**Figure 2-5. Regt FD, TPC Wire, and Met/RdrTel Nets Subscriber Table**

Address	Regt FD Net	TPC Wire Net	Met/Rdr Tel Net
X			
Y			
Z			
0			
1			MDS #1
2			MDS #2
3			MDS #3
4			MDS #4
5			
6			
7			
8			
9			
*			
?			
+			
0			
-			
#			
&			

Figure 2-5 (continued). Regt FD, TPC Wire, and Met/Rdr Tel Nets Subscriber Table

### e. Bn COF Nets

Figure 2-6 contains the standard addresses used on the COF nets at the artillery battalion. Four COF nets are provided. COF 1 and 2 may be combined to form a single COF A. COF 3 and 4 may be combined to form a single COF B.

Address	COF 1	COF 2	COF 3	COF 4
A	Bn FDC-Main	Bn FDC-Main	Bn FDC-Main	Bn FDC-Main
B	Bn FDC-Fwd	Bn FDC-Fwd	Bn FDC-Fwd	Bn FDC-Fwd
C	1st Bn FSCC-Main		3d Bn FSCC-Main	
D	1st Bn FSCC-Fwd		3d Bn FSCC-Fwd	
E	1st Company FO		1st Company FO	
F	2d Company FO		2d Company FO	
G	3d Company FO		3d Company FO	
H	4th Company FO		4th Company FO	
I	1st Battery FDC- 1st BCS		3d Battery FDC- 1st BCS	
J	1st Battery FDC- 2d BCS		3d Battery FDC- 2d BCS	
K		2d Bn FSCC-Main		4th Bn FSCC-Main
L		2d Bn FSCC-Fwd		4th Bn FSCC-Fwd
M		1st Company FO		1st Company FO
N		2d Company FO		2d Company FO
O		3d Company FO		3d Company FO
P		4th Company FO		4th Company FO
Q				
R				

Figure 2-6. COF Nets Subscriber Table

<b>Address</b>	<b>COF 1</b>	<b>COF 2</b>	<b>COF 3</b>	<b>COF 4</b>
<b>S</b>				
<b>T</b>				
<b>U</b>				
<b>V</b>				
<b>W</b>				
<b>X</b>				
<b>Y</b>				
<b>Z</b>				
<b>0</b>		<b>2d Battery FDC- 1st BCS</b>		<b>4th Battery FDC-1st BCS</b>
<b>1</b>		<b>2d Battery FDC- 2d BCS</b>		<b>4th Battery FDC-2d BCS</b>
<b>2</b>				
<b>3</b>				
<b>4</b>				
<b>5</b>				
<b>6</b>				
<b>7</b>				
<b>8</b>				
<b>9</b>				
<b>*</b>				
<b>?</b>				
<b>+</b>				
<b>0</b>				
<b>-</b>				
<b>#</b>				
<b>&amp;</b>				

**Figure 2-6 (continued). COF Nets Subscriber Table**

f. Subscriber Identification Codes

Subscriber identification (SID) codes must be unique for each subscriber and mirror those at the subscriber's device. Figures 2-7 through 2-16 provide unique subscriber identification codes for each subscriber by net. To determine the correct SID code, enter the table with the station, cross index with the subscriber, and extract the SID code to assign to that subscriber.

THEM	YOU									
	MEF MAIN	MEF FWD	1ST DIV MAIN	1ST DIV FWD	2D DIV MAIN	2D DIV FWD	3D DIV MAIN	3D DIV FWD	4TH DIV MAIN	4TH DIV FWD
MEF MAIN		M4/M4	M5/M5	M6/M6	M7/M7	M8/M8	M9/M9	M0/M0	N1/N1	N2/N2
MEF FWD		4M/M4	N3/N3	N4/N4	N5/N5	N6/N6	N7/N7	N8/N8	N9/N9	N0/N0
1ST DIV MAIN		5M/M5	3N/N3	TF/FT	UF/FU	VF/FV	HG/GH	IG/GI	JG/GJ	KG/GK
1ST DIV FWD		6M/M6	4N/N4	FT/TF	LG/GL	MG/GM	NG/GN	OG/GO	PG/GP	QG/GQ
2D DIV MAIN		7M/M7	5N/N5	FU/UF	GL/LG	RG/GR	SG/GS	TG/GT	UG/GU	VG/GV
2D DIV FWD		8M/M8	6N/N6	FV/VF	GM/MG	GR/RG	IH/HI	JH/HJ	KH/HK	LH/HL
3D DIV MAIN		9M/M9	7N/N7	GH/HG	GN/NG	GS/SG	HI/IH	MH/HM	NH/HN	OH/HO
3D DIV FWD		0M/M0	8N/N8	GI/IG	GO/OG	GT/TG	HJ/JH	HM/MH	PH/HP	QH/HQ
4TH DIV MAIN		1N/N1	9N/N9	GJ/JG	GP/PG	GU/UG	HK/KH	HN/NH	HP/PH	RH/HR
4TH DIV FWD		2N/N2	0N/N0	GK/KG	GQ/QG	GV/VG	HL/LH	HO/OH	HQ/QH	HR/RH

Figure 2-7. MEF FFC Net SID Codes

THEM	YOU													
	DIV MAIN	DIV FWD	1ST REGT MAIN	1ST REGT FWD	2D REGT MAIN	2D REGT FWD	3D REGT MAIN	3D REGT FWD	4TH REGT MAIN	4TH REGT FWD	ARTY REGT MAIN	ARTY REGT FWD	DASC MAIN	DASC FWD
DIV MAIN	0C/C0		1D/D1	2D/D2	3D/D3	4D/D4	5D/D5	6D/D6	SE/ES	KF/FK	9C/Q9	9R/R9	0S/S0	2U/U2
DIV FWD	0C/C0		7D/D7	8D/D8	9D/D9	0D/D0	1E/E1	2E/E2	TE/ET	LF/FL	0Q/Q0	0R/R0	1T/T1	3U/U3
1ST REGT MAIN	D1/I1D	D7/I7D		3E/E3	4E/E4	5E/E5	6E/E6	7E/E7	UE/EU	FM/MF	1R/R1	1S/S1	2T/T2	4U/U4
1ST REGT FWD	D2/I2D	D8/I8D	E3/I3E		8E/E8	9E/E9	0E/E0	1F/F1	VE/EV	NF/FN	2R/R2	2S/S2	3T/T3	5U/U5
2D REGT MAIN	D3/I3D	D9/I9D	E4/I4E	E8/I8E		2F/F2	3F/F3	4F/F4	GF/FG	OF/FO	3R/R3	3S/S3	4T/T4	6U/U6
2D REGT FWD	D4/I4D	D0/I0D	E5/I5E	E9/I9E	F2/I2F		5F/F5	6F/F6	HF/FH	PF/FP	4R/R4	4S/S4	5T/T5	7U/U7
3D REGT MAIN	D5/I5D	E1/I1E	E6/I6E	E0/I0E	F3/I3F	F5/I5F		7F/F7	IF/I1	QF/FQ	5R/R5	5S/S5	6T/T6	8U/U8
3D REGT FWD	D6/I6D	E2/I2E	E7/I7E	F1/I1F	F4/I4F	F6/I6F	F7/I7F		JF/IJ	RF/FR	6R/R6	6S/S6	7T/T7	9U/U9
4TH REGT MAIN	ES/ISE	ET/I7E	EU/IUE	EV/I7E	FG/IGF	FH/IHF	FI/I1F	FJ/IJF		SF/FS	7R/R7	7S/S7	8T/T8	0U/U0
4TH REGT FWD	FK/IKF	FL/I1F	FM/I1F	FN/I1F	FO/I0F	FP/I1F	FQ/I1F	FR/I1F	FS/I1F		8R/R8	8S/S8	9T/T9	1V/V1
ARTY REGT MAIN	Q9/I9Q	Q0/I0Q	R1/I1R	R2/I2R	R3/I3R	R4/I4R	R5/I5R	R6/I6R	R7/I7R	R8/I8R		9S/S9	0T/T0	2V/V2
ARTY REGT FWD	R9/I9R	RO/I0R	S1/I1S	S2/I2S	S3/I3S	S4/I4S	S5/I5S	S6/I6S	S7/I7S	S8/I8S	S9/I9S		1U/U1	3V/V3
DASC MAIN	S0/I0S	T1/I1T	T2/I2T	T3/I3T	T4/I4T	T5/I5T	T6/I6T	T7/I7T	T8/I8T	T9/I9T	T0/I0T	U1/I1U		4V/V4
DASC FWD	U2/I2U	U3/I3U	U4/I4U	U5/I5U	U6/I6U	U7/I7U	U8/I8U	U9/I9U	U0/I0U	V1/I1V	V2/I2V	V3/I3V	V4/I4V	

Figure 2-8. Div FSC Net SID Codes

THEM	YOU													
	REGT FDC MAIN	REGT FDC FWD	1ST BN FDC MAIN	1ST BN FDC FWD	2D BN FDC MAIN	2D BN FDC FWD	3D BN FDC MAIN	3D BN FDC FWD	4TH BN FDC MAIN	4TH BN FDC FWD	5TH BN FDC MAIN	5TH BN FDC FWD	MLRS FDC MAIN	MLRS FDC FWD
REGT FDC MAIN		BB/AA	DD/CC	FF/EE	HH/GG	JJ/II	LL/KK	ES/MM	PP/OO	00/99	TF/FT	UF/FU	VF/FV	HG/GH
REGT FDC FWD	AA/BB		RR/QQ	TT/SS	VV/UU	22/11	44/33	66/55	88/77	1A/A1	IG/GI	JG/GJ	KG/GK	LG/GL
1ST BN FDC MAIN	CC/DD	QQ/RR		2A/A2	3A/A3	4A/A4	5A/A5	6A/A6	7A/A7	8A/A8	MG/GM	NG/GN	OG/GO	PG/GP
1ST BN FDC FWD	EE/FF	SS/TT	A2/2A		9A/A9	0A/A0	1B/B1	2B/B2	3B/B3	4B/B4	QG/GQ	RG/GR	SG/GS	TG/GT
2D BN FDC MAIN	GG/HH	UU/VV	A3/3A	A9/9A		5B/B5	6B/B6	7B/B7	8B/B8	9B/B9	UG/GU	VG/GV	IH/HI	JH/HJ
2D BN FDC FWD	II/JJ	11/22	A4/4A	A0/0A	B5/5B		0B/B0	1C/C1	2C/C2	3C/C3	KH/HK	LH/HL	MH/HM	NH/HN
3D BN FDC MAIN	KK/LL	33/44	A5/5A	B1/1B	B6/6B	B0/0B		4C/C4	5C/C5	6C/C6	OH/HO	PH/HP	QH/HQ	RH/HR
3D BN FDC FWD	MM/ES	55/66	A6/6A	B2/2B	B7/7B	C1/1C	C4/4C		7C/C7	8C/C8	SH/HS	TH/HT	UH/HU	VH/HV
4TH BN FDC MAIN	OO/PP	77/88	A7/7A	B3/3B	B8/8B	C2/2C	C5/5C	C7/7C		9C/C9	J1/I1	IK/KI	LI/LI	MI/MI
4TH BN FDC FWD	99/00	A1/1A	A8/8A	B4/4B	B9/9B	C3/3C	C6/6C	C8/8C	C9/9C		NI/IN	O1/O1	PI/IP	Q1/Q1
4TH BN FDC MAIN	FT/TF	GI/IG	GM/IG	GQ/QG	GU/UG	HK/KH	HO/OH	HS/SH	IJ/JI	IN/NI		R1/R1	S1/S1	T1/T1
4TH BN FDC FWD	FU/UF	GJ/JG	GN/NG	GR/RG	GV/VG	HL/LH	HP/PH	HT/TH	IK/KI	IO/OI	IR/RI		U1/US	V1/IV
MLRS FDC MAIN	FV/VF	GK/KG	GO/OG	GS/SG	HI/IH	HM/MH	HQ/QH	HU/UH	IL/LI	IP/PI	IS/SI	IU/UI		KJ/JK
MLRS FDC FWD	GH/HG	GL/LG	GP/PG	GT/TG	HJ/JH	HN/NH	HR/RH	HV/VH	IM/MI	IQ/QI	IT/TI	IV/VI	JK/KJ	

Figure 2-9. Regt FD Net SID Codes

THEM	YOU											
	REGT FSCC MAIN	REGT FSCC FWD	ARTY BN FDC MAIN	ARTY BN FDC FWD	1ST BN FSCC MAIN	1ST BN FSCC FWD	2D BN FSCC MAIN	2D BN FSCC FWD	3D BN FSCC MAIN	3D BN FSCC FWD	4TH BN FSCC MAIN	4TH BN FSCC FWD
REGT FSCC MAIN		8F/8F	9F/F9	0F/F0	1G/G1	2G/G2	3G/G3	4G/G4	5G/G5	6G/G6	7G/G7	8G/G8
REGT FSCC FWD	F8/8F		9G/G9	0G/G0	1H/H1	2H/H2	3H/H3	4H/H4	5H/H5	6H/H6	7H/H7	8H/H8
ARTY BN FDC MAIN	F9/9F	G9/9G		9H/H9	0H/H0	1I/I1	2I/I2	3I/I3	4I/I4	5I/I5	6I/I6	7I/I7
ARTY BN FDC FWD	F0/0F	G0/0G	H9/9H		8I/I8	9I/I9	0I/I0	1J/J1	2J/J2	3J/J3	4J/J4	5J/J5
1ST BN FSCC MAIN	G1/1G	H1/1H	H0/0H	I8/8I		6J/J6	7J/J7	8J/J8	9J/J9	0J/J0	1K/K1	2K/K2
1ST BN FSCC FWD	G2/2G	H2/2H	I1/1I	I9/9I	J6/6J		3K/K3	4K/K4	5K/K5	6K/K6	7K/K7	8K/K8
2D BN FSCC MAIN	G3/3G	H3/3H	I2/2I	I0/0I	J7/7J	K3/3K		9K/K9	0K/K0	1L/L1	2L/L2	3L/L3
2D BN FSCC FWD	G4/4G	H4/4H	I3/3I	J1/1J	J8/8J	K4/4K	K9/9K		4L/L4	5L/L5	6L/L6	7L/L7
3D BN FSCC MAIN	G5/5G	H5/5H	I4/4I	J2/2J	J9/9J	K5/5K	K0/0K	L4/4L		8L/L8	9L/L9	0L/L0
3D BN FSCC FWD	G6/6G	H6/6H	I5/5I	J3/3J	J0/0J	K6/6K	L1/1L	L5/5L	L8/8L		1M/M1	2M/M2
4TH BN FSCC MAIN	G7/7G	H7/7H	I6/6I	J4/4J	K1/1K	K7/7K	L2/2L	L6/6L	L9/9L	M1/1M		3M/M3
4TH BN FSCC FWD	G8/8G	H8/8H	I7/7I	J5/5J	K2/2K	K8/8K	L3/3L	L7/7L	L0/0L	M2/2M	M3/3M	

Figure 2-10. Regt FSC Net SID Codes

	YOU										
THEM	ARTY BN FDC MAIN	ARTY BN FDC FWD	1ST BN FSCC MAIN	1ST BN FSCC FWD	1ST BTRY FDC, 1ST BCS	1ST BTRY FDC, 2D BCS	FO1	FO2	FO3	FO4	
ARTY BN FDC MAIN	4M/M4		5M/M6	6M/M6	7M/M7	8M/M8	9M/M9	0M/M0	1N/N1	2N/N2	
ARTY BN FDC FWD	M4/4M		3N/N3	4N/N4	5N/N5	6N/N6	7N/N7	8N/N8	9N/N9	0N/N0	
1ST BN FSCC MAIN	M5/5M	N3/3N		1O/O1	2O/O2	3O/O3	4O/O4	5O/O5	6O/O6	7O/O7	
1ST BN FSCC FWD	M6/6M	N4/4N	O1/1O		8O/O8	9O/O9	0O/O0	1P/P1	2P/P2	3P/P3	
1ST BTRY FDC, 1ST BCS	M7/7M	N5/5N	O2/2O	O8/8O		4P/P4	5P/P5	6P/P6	7P/P7	8P/P8	
1ST BTRY FDC, 2D BCS	M8/8M	N6/6N	O3/3O	O9/9O	P4/4P		9P/P9	0P/P0	1Q/Q1	2Q/Q2	
FO1	M9/9M	N7/7N	O4/4O	O0/0O	P5/5P	P8/8P		3Q/Q3	4Q/Q4	5Q/Q5	
FO2	M0/0M	N8/8N	O5/5O	P1/1P	P6/6P	P0/0P	Q3/3Q		6Q/Q6	7Q/Q7	
FO3	N1/1N	N9/9N	O6/6O	P2/2P	P7/7P	Q1/1Q	Q4/4Q	Q6/6Q		8Q/Q8	
FO4	N2/2N	N0/0N	O7/7O	P3/3P	P8/8P	Q2/2Q	Q5/5Q	Q7/7Q	Q8/8Q		

Figure 2-11. COF 1 SID Codes

THEM	YOU									
	ARTY BN FDC MAIN	ARTY BN FDC FWD	2D BN FSCC MAIN	2D BN FSCC FWD	2D BTRY FDC, 1ST BCS	2D BTRY FDC, 2D BCS	FO5	FO6	FO7	FO8
ARTY BN FDC MAIN	9Q/Q9 0Q/Q0 1R/R1 2R/R2 3R/R3 4R/R4 5R/R5 6R/R6 7R/R7									
ARTY BN FDC FWD	Q9/9Q		8R/R8	9R/R9	0R/R0	1S/S1	2S/S2	3S/S3	4S/S4	5S/S5
2D BN FSCC MAIN	Q0/QQ	R8/8R		6S/S6	7S/S7	8S/S8	9S/S9	0S/S0	1T/T1	2T/T2
2D BN FSCC FWD	R1/1R	R9/9R	S6/6S		3T/T3	4T/T4	5T/T5	6T/T6	7T/T7	8T/T8
2D BTRY FDC, 1ST BCS	R2/2R	R0/0R	S7/7S	T3/3T		9T/T9	0T/T0	1U/U1	2U/U2	3U/U3
2D BTRY FDC, 2D BCS	R3/3R	S1/1S	S8/8S	T4/4T	T9/9T		4U/U4	5U/U5	6U/U6	7U/U7
FO5	R4/4R	S2/2S	S9/9S	T5/5T	T0/0T	U4/4U		8U/U8	9U/U9	0U/U0
FO6	R5/5R	S3/3S	S0/0S	T6/6T	U1/1U	U5/5U	U8/8U		1V/V1	2V/V2
FO7	R6/6R	S4/4S	T1/1T	T7/7T	U2/2U	U6/6U	U9/9U	V1/1V		3V/V3
FO8	R7/7R	S5/5S	T2/2T	T8/8T	U3/3U	U7/7U	U0/0U	V2/2V	V3/3V	

Figure 2-12. COF 2 SID Codes

THEM	YOU									
	ARTY BN FDC MAIN	ARTY BN FDC FWD	3D BN FSCC MAIN	3D BN FSCC FWD	3D BTRY FDC, 1ST BCS	3D BTRY FDC, 2D BCS	FO9	FO10	FO11	FO12
ARTY BN FDC MAIN	4V/V4 5V/V5 6V/V6 7V/V7V V8/8V V9/9V V0/0V BAJ/AB CAJ/AC									
ARTY BN FDC FWD	V4/4V		DAJ/AD	EAJ/AE	FAJ/AF	GAJ/AG	HAI/AH	IAJ/AI	JAJ/AJ	KAJ/AK
3D BN FSCC MAIN	V5/5V	AD/DA		LAJ/AL	MAJ/AM	NAJ/AN	OAJ/AO	PAJ/AP	QAJ/AQ	RAJ/AR
3D BN FSCC FWD	V6/6V	AE/EA	AL/LA		SAJ/AS	TAJ/AT	UAJ/AU	VAJ/AV	CB/BC	DB/BD
3D BTRY FDC, 1ST BCS	V7/7V	AF/FA	AM/MA	AS/SA		EB/BE	FB/BF	GB/BG	HB/BH	IB/BI
3D BTRY FDC, 2D BCS	V8/8V	AG/GA	AN/NA	AT/TA	BE/EB		JB/BJ	KB/BK	LB/BL	MB/BM
FO9	V9/9V	AH/HA	AO/OA	AU/UA	BF/FB	BJ/ JB		NB/BN	OB/BO	PB/BP
FO10	V0/0V	AI/IA	AP/PA	AV/VA	BG/GB	BK/KB	BN/NB		QB/BQ	RB/BR
FO11	AB/BA	AJ/JA	AQ/QA	BC/CB	BH/HB	BL/LB	BO/OB	BQ/QB		SB/BS
FO12	AC/CA	AK/KA	AR/RA	BD/DB	BI/IB	BM/MB	BP/PB	BR/RB	BS/SB	

Figure 2-13. COF 3 SID Codes

THEM	YOU									
	ARTY BN FDC MAIN	ARTY BN FDC FWD	4TH BN FSCC MAIN	4TH BN FSCC FWD	4TH BTRY FDC, 1ST BCS	4TH BTRY FDC, 2D BCS	FO13	FO14	FO15	FO16
ARTY BN FDC MAIN	TS/BT	UB/BU	VB/BV	DC/CD	EC/CE	FC/CF	GC/CG	HC/CH	IC/CI	
ARTY BN FDC FWD	BT/TB	KC/CK	LC/CL	MC/CM	NC/CN	OC/CO	PC/CP	QC/CQ	RC/CR	
4TH BN FSCC MAIN	BU/UB	CK/KC	SC/CS	TC/CT	UC/CU	VC/CV	ED/DE	FD/DF	GD/DG	
4TH BN FSCC FWD	BV/VB	CL/LC	CS/SC	HD/DH	ID/DI	JD/DJ	KD/DK	LD/DL	MD/DM	
4TH BTRY FDC, 1ST BCS	CD/DC	CM/MC	CT/TC	DH/HD	ND/DN	OD/DO	PD/DP	QD/DQ	RD/DR	
4TH BTRY FDC, 2D BCS	CE/EC	CN/NC	CU/UC	DI/ID	DN/ND	SD/DS	TD/DT	UD/DU	VD/DV	
FO13	CF/FC	CO/OC	CV/VC	DJ/JD	DO/OD	DS/SD	FE/EF	GE/EG	HE/EH	
FO14	CG/GC	CP/PC	DE/ED	DK/KD	DP/PD	DT/TD	EF/FE	IE/EI	JE/EJ	
FO15	CH/HC	CQ/QC	DF/FD	DL/LD	DQ/QD	DU/UD	EG/GE	EI/IE	KE/EK	
FO16	CI/IC	CR/RC	DG/GD	DM/MD	DR/RD	DV/VD	EH/HE	EJ/JE	EK/KE	

Figure 2-14. COF 4 SID Codes

THEM	YOU			
	TPC MAIN	TPC FWD	ARTY REGT FDC MAIN	ARTY REGT FDC FWD
TPC MAIN	LE/EL	ME/EM	OE/EO	
TPC FWD	EL/LE	PE/EP	QE/EQ	
ARTY REGT FDC MAIN	EM/ME	EP/PE	RE/ER	
ARTY REGT FDC FWD	EO/OE	EQ/QE	ER/RE	

Figure 2-15. TPC Wire Net SID Codes

THEM	YOU	
	TPC MAIN	TPC FWD
TPC MAIN	SE/ES	
TPC FWD	ES/SE	
CBR1	ET/TE	FL/LF
CBR2	EU/UE	FM/MF
CBR3	EV/VE	FN/NF
CBR4	FG/GF	FO/OF
CBR5	JL/LJ	LJ/JL
MDS1	FH/HF	FP/PF
MDS2	FI/IF	FQ/QF
MDS3	FJ/JF	FR/RF
MDS4	FK/KF	FS/SF

Figure 2-16. Met/Rdr Tel Net Codes

**g. Logical Names**

Logical names must be identical in both the transmitting and the receiving variable format devices. Logical names are composed of five subfields. The first three subfields may contain only one character. The fourth subfield may contain one or two characters. The fifth subfield may contain up to three characters. The following logical name formats are established to ensure uniformity:

**(1) Units** (e.g., 1st Section, 2d Platoon, Company C, 1st Battalion, 23d Marines is **1/2/C/1\_/23**)

- [1] Section numerical designation
- [2] Platoon numerical designation
- [3] Battery or company letter designation
- [4] Battalion numerical designation
- [5] Regiment or brigade numerical designation

**(2) Battalion FSCC Main** (e.g., 1st Battalion, 4th Marines FSCC is **F/S/C/1\_/4\_\_**)

- [1] F
- [2] S
- [3] C
- [4] Battalion numerical designation
- [5] Regiment or brigade numerical designation

**(3) Battalion FSCC Forward** (e.g., 1st Battalion, 4th Marines FSCC forward is **F/W/D/1\_/4\_\_**)

- [1] F
- [2] W
- [3] D
- [4] Battalion numerical designation
- [5] Regiment or brigade tag

**(4) Task Force FSCC Main** (e.g., Task Force Hill FSCC is **T/F/H/1\_/MN\_**)

- [1] T
- [2] F
- [3] First letter of task force name
- [4] Sequential number of task force
- [5] MN

(5) Task Force FSCC Forward (e.g., Task Force Ripper FSCC Forward is T/F/R/2\_/FWD)

- [1] T
- [2] F
- [3] First letter of task force name
- [4] Sequential number of task force
- [5] FWD

(6) Regimental FSCC Main (e.g., 4th Marines FSCC is F/S/C/4\_/MR\_)

- [1] F
- [2] S
- [3] C
- [4] Regiment numerical designation
- [5] MR

(7) Regimental FSCC Forward (e.g., 4th Marines FSCC forward is F/W/D/4\_/MAR)

- [1] F
- [2] W
- [3] D
- [4] Regiment numerical designation
- [5] MAR

(8) Division FSCC Main (e.g., 1st Marine Division FSCC is F/S/C/1\_/MD\_)

- [1] F
- [2] S
- [3] C
- [4] Division numerical designation
- [5] MD

(9) Division FSCC Forward (e.g., 1st Marine Division FSCC forward is F/W/D/1\_/DIV)

- [1] F
- [2] W
- [3] D
- [4] Division numerical designation
- [5] DIV

**(10) DASC Main** (e.g., DASC supporting 1st Marine Division is D/A/S/1\_/AW\_)

- [1] D
- [2] A
- [3] S
- [4] Numerical designation of GCE supported
- [5] AW

**(11) DASC Forward** (e.g., DASC supporting 1st Marine Division forward is D/A/S/1\_/FWD)

- [1] D
- [2] A
- [3] S
- [4] Numerical designation of GCE supported
- [5] FWD

**(12) MEF FFCC Main** (e.g., II MEF FFCC is F/F/C/2\_/MF\_)

- [1] F
- [2] F
- [3] C
- [4] MEF numerical designation
- [5] MF

**(13) MEF FFCC Forward** (e.g., II MEF FFCC forward is F/W/D/2\_/MEF)

- [1] F
- [2] W
- [3] D
- [4] MEF numerical designation
- [5] MEF

**(14) MEF(F) FFCC Main** (e.g., III MEF(F) FFCC is F/F/C/3\_/FF)

- [1] F
- [2] F
- [3] C
- [4] MEF(F) numerical designation
- [5] FF

**(15) MEF(F) FFCC Forward (e.g., III MEF(F) FFCC forward is F/W/D/3\_/MFF)**

- [1] F
- [2] W
- [3] D
- [4] MEF numerical designation
- [5] FF

**(16) MEU FFCC Main/SACC (e.g., 22d MEU FFCC is F/F/C/22/MU\_)**

- [1] F
- [2] F
- [3] C
- [4] MEU numerical designation
- [5] MU

**(17) MEU FFCC Forward (ashore) (e.g., 22d MEU FFCC forward is F/W/D/22/MEU)**

- [1] F
- [2] W
- [3] D
- [4] MEU numerical designation
- [5] MEU

**(18) FOs Assigned to Infantry Companies (e.g., FO for Company A, 3d Battalion, 8th Marines is F/O/A/83/\_\_\_)**

- [1] F
- [2] O
- [3] Company letter designation
- [4] FO number
- [5] Blank

**NOTE:** FO numbers may be derived from the regiment number and company; e.g., for 5th Marines, Alfa 1/5 FO is **51**, Bravo 1/5 FO is **52**, etc. Local SOPs or operations orders may also be used to establish FO numbering procedures.

**(19) FOs Assigned to Separate Battalions** (e.g., FO for Company B, 2d Tank Battalion is **F/O/B/51/TNK**)

- [1] F
- [2] O
- [3] Company
- [4] FO number
- [5] Three letters for battalion

**NOTE:** Assign FO numbers from unused numbers in MEF; e.g., in II MEF, use **4\_** for light armored reconnaissance (LAR) battalion, **5\_** for tank battalion, **9\_** for assault amphibious vehicle (AAV) battalion. Local SOPs or operations orders may also be used to establish FO numbering procedures. The battalion subfield will use **TNK** for tank battalion, **LAR** for LAR battalion, **AAV** for AAV battalion.

**(20) Firing Battery FDC** (e.g., Battery G, 3d Battalion, 10th Marines FDC is **\_/\_/G/3\_/10\_**)

- [1] Blank
- [2] Blank or **2** to indicate battery operations center (BOC)
- [3] Firing battery letter designation
- [4] Artillery battalion numerical designation
- [5] Artillery regiment or brigade numerical designation

**(21) Artillery Battalion FDC** (e.g., 3d Battalion, 11th Marines FDC is **\_/\_/\_/3\_/11\_**)

- [1] Blank
- [2] Blank
- [3] Blank
- [4] Artillery battalion numerical designation
- [5] Artillery regiment or brigade numerical designation

**NOTE:** During displacement of the battalion FDC, the forward echelon is indicated by **F**, **W**, and **D** in the first three subfields.

**(22) Regimental FDC (e.g., 14th Marines FDC is \_/\_/\_/14/MR\_)**

- [1] Blank
- [2] Blank
- [3] Blank
- [4] Artillery regiment numerical designation
- [5] MR

**NOTE:** During displacement of the regimental FDC, the forward echelon is indicated by **F**, **W**, and **D** in the first three subfields.

**(23) Met Stations (MDS/MMS) (e.g., 2d Met Team is M/E/T/2/\_/\_\_\_)**

- [1] M
- [2] D
- [3] S
- [4] Team number
- [5] Blank

**(24) Radars (e.g., 3d Radar Section is C/B/R/03/\_/\_\_\_)**

- [1] C
- [2] B
- [3] R
- [4] Team number
- [5] Blank

**(25) Main TPC (e.g., 11th Marines TPC is T/P/C/11/MR\_)**

- [1] T
- [2] P
- [3] C
- [4] Regiment numerical designation
- [5] MR

**(26) Forward TPC (e.g., 11th Marines TPC forward is F/W/D/11/TPC)**

- [1] F
- [2] W
- [3] D
- [4] Regiment numerical designation
- [5] TPC

**(27) Mortar Platoons** (e.g., 3d Battalion, 24th Marines 81 mm Mortar Platoon is 8/1/M/3\_/24\_)

- [1] 8
- [2] 1
- [3] M
- [4] Battalion numerical designation
- [5] Regiment numerical designation

**(28) Naval Surface Fire Support (NSFS) Ship** (e.g., USS Virginia CGN-38 is \_/5/C/54/38\_)

- [1] Blank
- [2] Weapon bore diameter in inches
- [3] C=Cruiser, D=Destroyer, F=Frigate
- [4] Caliber length of tube
- [5] Hull number

#### **h. Subscriber Device Type**

The device type assigned to a subscriber determines the format of transmitted messages and the routing of messages.

**(1) Message Format.** Digital devices are classified as either variable or fixed format.

(a) A variable format message device can reformat a message to meet the requirements of the receiving device. A variable format BCS, for example, transmits the observer location to a BCT (also a variable format message device) as a **FM;OBCO** message, but the same message is transmitted to a fixed format DMS as a string of characters that are received as an observer location message.

(b) A fixed format device transmits a string of 38 characters that are interpreted as one of a limited catalog of messages.

(c) Identifying an incorrect device type can result in messages transmitted in a form that will be received in error or not at all.

**(2) Message Routing.** The same device types control the routing of messages during fire mission processing.

(a) The digital message device (DMD) identifies the subscriber as an FO. This causes MCFSS computers to assign the subscriber value from the fourth subfield of the logical name as the FO originating the mission.

(b) The fire support team DMD (FISTDMD) causes MCFSS computers to expect the fire mission to pass through this agency for approval prior to arriving at the FDC. MCFSS computers will expect initial calls for fire to be transmitted from this station but will attempt to route subsequent FO;COMD messages (e.g., "ready," "shot," "rounds complete") directly to the FO.

#### i. Required Software Communications Parameters

Figure 2-17 lists the data required for subscriber setup by different data systems and the names of the entries by device.

COMM PARAMETER	DEVICE					
	AN/GYG-1(V) BCT	AN/GYK-37 IFSAS	AN/TMQ-31 MDS	AN/TPQ-36 RADAR	AN/PSC-2A DMS	AN/GYK-37(V) BCS
LOGICAL NAME	NAME	NAME	NAME	NOT USED	NAME	LOGICAL NAME
NET	NET ID	NET ID	NOT USED	NOT USED	NOT USED	NET
PHYSICAL ADDRESS	ADDRESS	ADDRESS	SOURCE	DESTINATION ID	ADDRESS	ADDRESS
MOI ADDRESS	MOI ADDRESS	MOI ADDRESS	NOT USED	NOT USED	NOT USED	NOT USED
KEYTIME	KEYTIME	KEYTIME		KEYING BLOCK	KEYTIME	PREAMBLE
NET ACCESS PRIORITY	NET ACCESS	NET ACCESS		CLEAR NET DELAY	PRIORITY	DELAY
SID CODES	SID	SID	NOT USED	NOT USED	NOT USED	NOT USED
DEVICE TYPE	DEVICE	DEVICE		TYPE	COMPUTER: YES/NO	DEVICE
AGENCY	AGENCY	AGENCY	NOT USED	NOT USED	NOT USED	NOT USED
FSK TONE PAIR	TONES	TONES	NOT USED	NOT USED	TONE PAIR	FSK
BLOCK MODE	BLOCK	BLOCK	BLOCK	BLOCK	BLOCK	MODE

Figure 2-17. Data Systems Subscriber Setup

j. Subscriber Table Format

All subscriber data is published in the standard format shown in figure 2-18 and explained below. Not every device on the net will require all the data presented; however, a common table is provided for brevity and simplicity.

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD				
1	____/____/____/____	@@@@	#_/_#_/_#_/_#_	@					

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUB
2	@@@@	____/____/____/____	@@@	@	@	@@@@@	@@@@@@@	1

Figure 2-18. Subscriber Data

(1) Line 1 Explanation. Line 1 is OWN NAME information.

LINE #	Provides a reference for ease in identifying a line in the table. This begins the net data for the station.
OWN NAME	The name of the station as it is entered in the net settings.
NET	Indicates the net for which the following data is provided.
NET ACCESS	Provides net priority values used to establish the net settings.
PHY ADD	The character assigned as the station's address.
MOI ADD	Left blank.

**(2) Line 2 Explanation.** Line 2 and subsequent lines list the subscriber data for the stations on the net.

<b>LINE #</b>	Provides a reference for the lines of subscriber data. This begins the subscriber portion of the table.
<b>NET</b>	The net on which the following subscribers communicate.
<b>LOGICAL NAME</b>	The name of the station as it is entered in the subscriber data.
<b>DEVICE</b>	The MCFSS device used by the subscriber.
<b>PHY ADD</b>	The character assigned as the subscriber's address based on paragraph 1004a.
<b>MOI ADD</b>	The same character as the <b>PHY ADD</b> .
<b>SID CODE</b>	The subscriber identification code assigned based on paragraph 2004b.
<b>AGENCY</b>	The type of target acquisition agency that the subscriber represents. If the subscriber is not a target acquisition agency, <b>OTHER</b> is used.
<b>MULTISUB</b>	For a multisubscriber group, this is a numerical entry. Each member of a given group is assigned the same number. All multisubscriber group 1 members are entered as a single multisubscriber group, etc.

## 2005. Communications Etiquette

### a. Entering the Net

Stations entering the net will establish voice communications on the appropriate coordination net using the communications equipment assigned for the data net (Bn FD Net [voice] for FOs, firing battery FDCs, and battalion FSCCs entering COF Nets). When satisfactory voice communications are established, the NCS directs the station to enter the

data net and send a data communications check. The subscriber station then changes frequencies from the coordination net to the data net and transmits communications check data.

#### **b. Troubleshooting**

Communications troubleshooting will be directed by the NCS on the appropriate coordination (Bn FD Net for stations on COF nets).

### **2006. Device-Specific Communications Entries**

#### **a. BCT/LCU Setup**

In addition to communications net settings and subscriber data, the BCT/LCU require the following file entries and modifications to exchange information between stations. This exchange is required to perform the tasks listed in later chapters of this publication.

**(1) Default Subscriber.** Only battalion FDCs will establish a default subscriber based on the battalion's mission.

(a) Artillery battalions with DS, GS, or GSR missions enter the regimental FDC as the default subscriber.

(b) Artillery battalions with R missions enter the reinforced battalion FDC as the default subscriber.

**(2) ATI Mode.** Though not a communications entry, the ATI mode governs the automatic transmission of targeting messages. The ATI mode established is dependent upon the station.

(a) MEF FFCC is operated in mode 3.

(b) Division FSCC is operated in mode 3.

(c) DASC is operated in mode 1.

(d) Regimental FSCC is operated in mode 3.

(e) Regimental FDC is operated in mode 1.

(f) TPC is operated in mode 3.

(g) Battalion FDC is operated in mode 1 with regimental FDC as the default subscriber.

(h) Battalion FSCC is operated in mode 1.

**(3) Standing Requests for Information (SRIs).** All SRIs are established as level 3 requests as shown below.

(a) SRIs Established at the MEF FFCC are —

**For the Division FSCC**

All targets short of the FSCL

(b) SRIs Established at the Division FSCC are —

**For the MEF FFCC**

All targets beyond the FSCL

**For the DASC**

All ADA/NG targets

**For the Artillery Regimental FDC**

All PERSONNEL/OP targets

All SUPPLY/AMMO targets

All EQUIPMENT/RADAR targets

**For the Artillery Regimental TPC**

All ARTY/NOT GIVEN targets

All RKTMSL/NOT GIVEN targets

All MORT/NOT GIVEN targets

**For Infantry Regimental FSCCs**

All targets in the regiment's zone

(c) SRIs Established at the Infantry Regimental FSCC are —

**For the Maneuver Battalion FSCC**

All targets in the battalion's zone

**(4) Message of Interest Setup.** MOI processing allows a message to be automatically transmitted to a station to which the information is pertinent. MOI processing is governed by action and direction codes.

(a) Three possible action codes are —

<b>INCOMING</b>	Processes the message selected as an MOI when that message is received by the computer.
<b>OUTGOING</b>	Processes the selected message type when the message is transmitted from the computer.
<b>BOTH</b>	Processes the selected message type when the message is received or transmitted.

(b) Three possible direction codes are —

<b>SEND ALWAYS</b>	Causes the MOI to be transmitted for any messages meeting the action code.
<b>SEND IF FROM OBSERVERS OR ZONE</b>	Causes the computer to only MOI the message if it originated from an associated observer or from a grid within an associated zone. Up to 12 observers and two zones may be associated with an MOI subscriber.
<b>SEND IF FROM OBSERVERS</b>	Causes the computer to only MOI the message if it originated from an associated observer.

(c) All MOI messages provide both the action and direction codes. If required, the associated zone is that of the MOI subscriber, and associated FOs are the subordinate FOs that support that FSCC.

(d) MOIs established at the maneuver battalion FSCC are —

<u>To the Regimental FSCC</u>	<u>To the Battalion FDC</u>
FM;OBCO I/A	FM;OBCO I/A
ATI;CDR I/A	
ATI;AZR I/A	
ATI;SHR I/A	
AFU;MFR I/A	

(e) MOIs established at artillery battalion FDCs with DS, GS, and R missions are —

<u>To the Regimental FSCC</u>	<u>To the Battalion FDC</u>	<u>To the Battery FDC</u>
ATI;CDR I/A	AFU;MFR I/B	SPRT;MAP I/A
ATI;AZR I/A		FM;OBCO I/A
ATI;SHR I/A		SPRT;BGEOM I/A
ATI;CBTI I/A		SPRT;ZONE I/A
ATI;SVL I/A		MET;CM I/A
AFU;UPDATE I/A		AFU;REG I/A
AFU;AMMO I/A		
AFU;MFR I/A		

**NOTE:** For GS and GSR missions, change all MOIs (except ATI messages) listed for the infantry regimental FSCC to route to the artillery regimental FDC and change ATI messages to route to the division FSCC. For R missions, change MOIs listed for the infantry regimental FSCC to route to the reinforced artillery battalion FDC and delete AFU;UPDATE and AFU;AMMO.

(f) MOIs established at artillery battalion FDCs with GS and R missions require relay communications with the division FSCC through the regimental FDC.

(g) MOIs established at the infantry regimental FSCC are —

<u>To the Division FSCC</u>	<u>To the Battalion FSCC</u>	<u>To the Battalion FDC</u>	<u>To the Adjacent Regiment FSCC</u>
FM;OBCO I/A ATI;CDR I/A ATI;AZR I/A ATI;SHR I/A ATI;CBTI I/A ATI;SVL I/A	AFU;UPDATE I/A AFU;AMMO I/A	SPRT;MAP I/A SPRT;BGEOM I/A SPRT;ZONE I/A	AFU;MFR I/B

(h) MOIs established at the artillery regimental FDC are —

<u>To the Division FSCC</u>	<u>To the TPC</u>	<u>To All Battalion FDCs</u>
AFU;UPDATE I/A AFU;AMMO I/A AFU;MFR I/A	SPRT;MAP I/A SPRT;BGEOM I/A SPRT;ZONE I/A ATI;CDR I/A ATI;SHR I/A AFU;UPDATE I/A AFU;AMMO I/A	SPRT;MAP I/A SPRT;BGEOM I/A SPRT;ZONE I/A FM;OBCO I/A MET;CM I/A

(i) MOIs established at the TPC are —

<u>To the Division FSCC</u>	<u>To the Regimental FDC</u>
FM;OBCO I/A	MET;CM I/A

(j) MOIs established at the division FSCC are —

<u>To the MEF FFCC</u>	<u>To the DASC</u>	<u>To the Artillery Regimental FDC</u>
SPRT;BGEOM I/A SPRT;ZONE I/A	FM;OBCO I/A SPRT;BGEOM I/A SPRT;ZONE I/A SPRT;MAP I/A	SPRT;BGEOM I/A SPRT;ZONE I/A FM;OBCO I/A ATI;SHR I/A

**(5) Priority, Classification, Logging, and Display (PCLD) Changes.** PCLD changes allow the operator to change the default settings that control message priority, printing (logging), display on screen, and security classification for transmission. The changes shown in figure 2-19 will be made. Additional changes are made at the discretion of the supervisor of each station.

**NOTE:** Changing a processable message to display NO will cause the computer to *automatically* process the message when received.

MESSAGE	PRIORITY	LOGGING	DISPLAY
AFU;AMMO			N
AFU;MFR	5		N
AFU;UPDATE	5 (NOTE 1)		N (NOTE 1)
ATI;AZR			Y
ATI;CDR			Y
ATI;SHR			N
SPRT;BGEOM	5 (NOTE 2)		N (NOTE 2)
SPRT;ZONE	5 (NOTE 2)		N (NOTE 2)
MET;CM			N (NOTE 2)
FM;CFF			Y
FM;SUBS			Y
FM;OBCO	5 (NOTE 3)		N (NOTE 3)
NOTE 1: All FSCCs only. NOTE 2: All FDCs only. NOTE 3: All stations except battalion FSCC and TPC.			

Figure 2-19. PCLD Changes

**(6) Legal Message Setup.** The BCT and LCU require the establishment of legal messages. This can be accomplished in one of two ways.

**(a) Method One.** For all subscribers, assign defaults. For all BCT/LCUs, make the following messages legal for all subscribers at or above battalion level:

- AFU;COMD
- ATI;COMD
- ATI;QUERY
- ATI;SEARCH
- ATI;SRI
- FM;ATTACK
- FM;MOD
- MET;COMD
- NNFP;ATTACK
- NNFP;FASCAM
- SPRT;COMD

**(b) Method Two.** Make all messages legal for all subscribers in the computer's legal subscriber (LGSB) setup.

**(reverse blank)**

## **Chapter 3**

# **MCFSS Initialization**

### **3001. General**

Initialization is the procedure which constructs the data base in the LCU or BCT. During initialization, data is input that establishes the computer identity (OWN NAME), target block assignment, and tactical data that allow computers to determine tactical fire direction solutions. Because LCU/BCT (i.e., IFSAS or LTACFIRE) software is a derivative of the Army's TACFIRE system, computers are designed to function as tactical fire direction devices and not true fire support devices. The procedures directed in this chapter allow the LCU/BCT to best perform the various fire support functions.

### **3002. Tactical Fire Direction Modes**

Though tactical fire direction at the battalion-battery level is outside the scope of this chapter, it is necessary to understand these modes as they affect the setup of computer equipment. MCFSS provides the capability to process missions in the following three different modes.

#### **a. FSCC Approval Mode**

In this mode, the observer transmits calls for fire to the battalion FSCC for positive clearance of fires. The battalion FSCC then transmits the cleared mission to the battalion FDC.

#### **b. Centralized Mode**

In this mode, the observer transmits all calls for fire to the battalion FDC. Clearance to fire is obtained by the automatic transmission of an MOI to the battalion FSCC.

#### **c. MEU Operations Mode**

This mode is similar to the FSCC Approval Mode, except that there is no battalion FDC to control the firing battery. In this mode, the battalion FSCC receives all calls for fire then selects the unit to attack the target and transmits a MOI to the Marine air-ground task force (MAGTF) FFCC.

### **3003. MAGTF Force Fires Coordination Center**

#### **a. Overview of Operations**

The MAGTF FFCC coordinates with adjacent units (e.g., Army corps) and also resolves coordination of fires between subordinate elements. Targets beyond the FSCL are stored and managed at this level by the use of ATI **MODE 3**.

#### **b. Communications**

(1) **Nets.** The MAGTF FFCC communicates on the data nets as described in paragraph 2002.

(2) **Message of Interest.** The MAGTF FFCC establishes no required MOI files.

(3) **PCLD Changes.** Required PCLD changes from default settings are described in paragraph 2006a(5).

(4) **Relay Subscriber.** The MEF FFCC may communicate with the following stations using relay communications:

- DASC on the MEF FFC Net via the division FSCC.
- Regimental FSCCs on the MEF FFC Net via the division FSCC.
- Regimental FDC on the MEF FFC Net via the division FSCC.

The MEU FFCC may communicate with the following stations using relay communications:

- DASC or air support element (ASE) on the MEU FFC Net via the battalion landing team (BLT) FSCC.
- Battery FDC on the MEU FFC Net via the BLT FSCC.

#### **c. Commander's Criteria**

The following specific modifications to commander's criteria messages are required to enable the LCU/BCT to function as a MAGTF FFCC.

<b>FM;MOD</b>	The current, active MAGTF <b>ZONE</b> name is entered. <b>IGNORE AMMO</b> causes the computer to solve all tactical fire control problems using the optimum ammunition. This overrides the ammunition available as reported in <b>AFU;AMMO</b> messages and results in assignment of ammunition that units may not possess. <b>IGNORE AMMO</b> is set to <b>NO</b> .
<b>FM;ATTACK</b>	Attack criteria are entered based on the tactical situation and the MAGTF commander's concept of operations. When changed, new commander's criteria is disseminated to subordinate commands via the appropriate message.
<b>FM;FUSEL</b>	No fire unit ordering or battalion assignment is necessary since all fire missions are passed to the regimental FDC using <b>FM;CFF:X</b> processing due to exclusion of fire units.
<b>FM;XCLUDE</b>	All fire units are excluded in the current situation. This is done to preclude generation of fire commands.
<b>FM;CENTER</b>	No fire units are assigned to center files since fire missions are passed to the regimental FDC via <b>FM;CFF:X</b> processing.

### **3004. Division FSCC**

#### **a. Overview of Operations**

The division FSCC coordinates operations and fire support with the MEF FFCC as necessary. It resolves coordination problems between subordinate units and, along with the regimental FDC, conducts fire planning for the division. The division FSCC stores the target files of the division and collects all **ATI** messages generated by subordinate units and agencies using **ATI MODE 3**.

**b. Communications**

(1) **Nets.** The division FSCC communicates on nets as described in paragraph 2002.

(2) **Message of Interest.** The division FSCC establishes MOI files as provided for in paragraph 2006a(4)(i).

(3) **PLCD Changes.** PLCD changes required from the default settings are described in paragraph 2006a(5).

(4) **Relay Subscriber.** The division FSCC can communicate with the following stations using relay communications:

- TPC on the Div FSC Net via the regimental FDC.
- Battalion FSCCs on the Div FSC Net via the regimental FSCC.

**c. Commander's Criteria**

In addition to the commander's criteria given verbally and in written orders, the following prerequisite changes must be made to employ the system.

<b>FM;MOD</b>	The current, active division <b>ZONE</b> name is entered. <b>IGNORE AMMO</b> is set to <b>NO</b> .
<b>FM;ATTACK</b>	Attack criteria are entered based on the tactical situation. The division FSCC is responsible for updating not only their own attack method, but also the regimental FDC's attack data by transmitting the <b>FM;ATTACK</b> message for each change.
<b>FM;FUSEL</b>	All fire units are ordered under the artillery regiment's name since all fire missions are passed to the regimental FDC using a <b>FM;CFF:X</b> . Supporting NSFS ships may be ordered under the regimental FSCC's own name to allow the ships to be considered for engagement of targets processed by the FSCC computer.
<b>FM;XCLUDE</b>	No fire units are excluded in the current situation.

<b>FM;CENTER</b>	All artillery fire units are assigned to a center file under the regimental FDC's name.
<b>ATI MOD</b>	The division FSCC is responsible for establishing and updating not only its own <b>ATI</b> modifications, but also for publishing and updating <b>ATI</b> modifications for the TPC based on commander's guidance.

### **3005. DASC**

#### **a. Overview of Operations**

The DASC receives current and future operations **AFU** and **SUPPORT** data from the division FSCC.

#### **b. Communications**

**(1) Nets.** The DASC communicates on nets as described in paragraph 2002.

**(2) Relay Subscriber.** The DASC can access the following subscribers using relay communications:

- MEF FFCC on the Div FSC Net via the division FSCC.
- MEU FFCC on the Bn FSC Net via the BLT FSCC if supporting a MEU.
- Regimental FSCC on the Div FSC Net via the division FSCC.
- Regimental FDC on the Div FSC Net via the division FSCC.

#### **c. Commander's Criteria**

In addition to the commander's criteria given verbally and in orders, the following prerequisite changes must be made to employ MCFSS.

<b>FM;MOD</b>	The current, active division <b>ZONE</b> name is entered. <b>IGNORE AMMO</b> is set to <b>NO</b> .
<b>FM;ATTACK</b>	Attack criteria are entered based on that provided by the division FSCC.

<b>FM;FUSEL</b>	No fire unit ordering or battalion assignment is necessary as all fire missions are passed to the division FSCC using <b>FM;CFF:X</b> processing due to exclusion of fire units.
<b>FM;XCLUDE</b>	All fire units are excluded in the current situation. This is done to preclude generation of fire commands.
<b>FM;CENTER</b>	No fire units are assigned to center files since fire missions are passed to the division FDC.

### 3006. Infantry Regimental FSCC

#### a. Overview of Operations

The regimental FSCC coordinates operations and fire support with the division FSCC as necessary. It resolves coordination problems between subordinate battalions and, along with the supporting battalion FDC, conducts fire planning for the regiment. The regimental FSCC accesses the target files of the division. In the absence of a higher GCE headquarters, the regimental FSCC collects all **ATI** messages generated by subordinate units and agencies and maintains the target file by operating in **ATI MODE 3**.

#### b. Communications

(1) **Nets.** The regimental FSCC communicates on the nets described in paragraph 2002.

(2) **Message of Interest.** The regimental FSCC establishes **MOI** files as provided for in paragraph 2006a(4)(f).

(3) **PCLD Changes.** Required **PCLD** changes from the default settings are described in paragraph 2006a(5).

**(4) Relay Subscriber.** The regimental FSCC can access the following subscribers using relay communications:

- Division FSCC on the Regt FSC Net via the division FSCC.
- Regimental FDC on the Regt FSC Net via the division FSCC.
- Battery FDCs on the Regt FSC Net via the battalion FDC.
- Any subordinate FO on the Regt FSC Net via his battalion FSCC.

**c. Commander's Criteria**

**ATI MOD** Fire missions and target combinations are not generated at this level. **ATI;SVMOD** message **QMOD** value is set to **4.0**, and **ATI;FMMOD** message **WTYP** is set to **99** to preclude combinations or fire missions from being generated.

**FM;MOD** The current, active regimental **ZONE** name is entered. **IGNORE AMMO** is set to **NO**.

**FM;ATTACK** The infantry regimental commander establishes attack criteria based on his mission and concept of operations. The regimental FSCC is responsible for providing and updating commander's criteria for the supporting artillery battalion FDC as well as subordinate battalions' FSCCs. This attack criteria may differ from that established by the division FSCC. However, targets defined as "volleys" or "effects" targets will not be redefined. Only "desired effects" or "desired volleys" may be changed. This limitation is required to prevent the "desired volume of fire" in a **FM;CFF:X** (request for reinforcing fires) generated for a volleys target from being interpreted as "remaining effects to be achieved" at the regimental FDC (which maintains the division commander's attack method).

**FM;FUSEL** All fire units of the supporting artillery battalion FDC are ordered under the artillery battalion name. The mortar platoons of subordinate infantry battalions are ordered under their battalion FSCC name with a higher value (i.e., lower precedence)

than artillery units. Supporting NSFS ships may be ordered under the regimental FSCC's own name to allow the ships to be considered for engagement of targets processed at the FSCC computer.

**FM;XCLUDE**

All fire units are excluded in the current situation. This is done to preclude generation of fire commands.

**FM;CENTER**

The fire units of the supporting artillery battalion are assigned to a center file under the artillery battalion name. The mortar platoons of the subordinate battalions are assigned as centers under the battalions' FSCC names.

### **3007. Artillery Regimental FDC**

#### **a. Overview of Operations**

The regimental FDC coordinates the operations of subordinate artillery battalions. The fires of the regiment are massed by the regimental FDC as the situation requires. Counterfire missions and planning are carried out by the regimental FDC and the TPC.

#### **b. Communications**

**(1) Nets.** The regimental FDC communicates on the nets described in paragraph 2002.

**(2) Message of Interest.** The regimental FDC establishes the MOI files as provided for in paragraph 2006a(4)(g).

**(3) PCLD Changes.** PCLD changes required from the default settings are described in paragraph 2006a(5).

**(4) Relay Subscriber.** The regimental FDC accesses the following stations using relay communications:

- MEF FFCC on the Div FSC Net via the division FSCC.
- DASC on the Div FSC Net via the division FSCC.
- Regimental FSCCs on the Regt FD Net via battalion FDCs.

**c. Commander's Criteria**

<b>FM;MOD</b>	The regimental FDC establishes the current, active <b>ZONE</b> of the division. <b>IGNORE AMMO</b> is set to <b>NO</b> . <b>AUTOFF</b> is allowed to default to <b>NO</b> .
<b>FM;ATTACK</b>	The regimental FDC enters the same attack method as the division FSCC.
<b>FM;FUSEL</b>	Fire units of GS battalions are ordered to take precedence in selection (i.e., ordered with a lower number), followed by GSR battalions, and lastly (with the lowest precedence) DS fire units.
<b>FM;XCLUDE</b>	No fire units are excluded as a matter of setup. Tactical and operational requirements may dictate exclusions during actual operations.
<b>FM;CENTER</b>	All fire units of subordinate battalions are assigned to the battalion names as <b>FM;CENTER</b> files.

### **3008. Maneuver Battalion FSCC**

**a. Overview of Operations**

The battalion FSCC coordinates and clears fires for its supporting forward observers and other agencies firing into its zone. In conjunction with its supporting artillery, the battalion FSCC plans the fires of the battalion.

**b. Communications**

**(1) Nets.** The battalion FSCC communicates on the nets described in paragraph 2002.

(2) **Message of Interest.** The battalion FSCC establishes the MOI files as provided for in paragraph 2006a(4)(d).

(3) **PCLD Changes.** PCLD changes required from the default settings are described in paragraph 2006a(5)

(4) **Relay Subscriber.** The battalion FSCC can communicate with the following subscribers using relay communications:

- The division FSCC on the Regt FSC Net via the regimental FSCC.
- Firing batteries of the supporting artillery battalion that are netted on other COFs by relaying through the battalion FDC.

**c. Commander's Criteria**

<b>FM;MOD</b>	The battalion FSCC establishes the current, active <b>ZONE</b> of the battalion. <b>IGNORE AMMO</b> is set to <b>NO</b> .
<b>FM;ATTACK</b>	The battalion FSCC enters the attack method based on the maneuver battalion commander's mission and concept of operations.
<b>FM;FUSEL</b>	Fire units of the supporting artillery battalion and any reinforcing artillery are ordered under the name of the DS battalion to take a lower precedence in selection (i.e., ordered with a higher number) than the organic mortar platoon.
<b>FM;XCLUDE</b>	No fire units are excluded as a matter of setup. Tactical and operational requirements may dictate exclusions during actual operations.
<b>FM;CENTER</b>	All fire units of supporting DS and R artillery battalions are assigned to the name of the DS battalion as center files.

### 3009. Battalion FSCC Equipped with a DMS

#### a. Overview of Operations

When foot mobile, the battalion FSCC may not have the capability to access an LCU. A DMS may be used in the Fire Request Approval Mode to allow the battalion FSCC to coordinate fires. The FO transmits all calls for fire to the battalion FSCC where they are cleared then retransmitted to the artillery battalion FDC. Subsequent corrections are transmitted by the FO to the battalion FDC. Subsequent corrections and FO commands are reviewed at the battalion FSCC using the monitor capability of the DMS.

#### b. Communications

(1) **Nets.** The battalion FSCC communicates on a COF net. Communications with the regimental FSCC are achieved by relay through the battalion FDC.

(2) **Authentication Code Files.** Authentication files are established and assigned to any subscriber equipped with an LCU, BCT, or BCS, or for any subscriber that relays through these devices. The files are established by entering a serial number corresponding to the line number; e.g., at **CODE 02: \_\_**, enter **02**. These are interpreted by other computer devices as serial numbers.

(3) **FIST:YES/NO.** FIST:YES/NO is established as FIST:YES with the battalion FDC as the **DFLT DEST** (default destination).

(4) **ADDRESS FILE.** ADDRESS FILE is modified so that the subordinate FOs are monitored using setting **B-ALL** (the FO as both **[B]** the source and destination of monitored messages with all **[ALL]** messages monitored).

### 3010. Artillery Battalion FDC

#### a. Overview of Operations

The battalion FDC's functions are governed by its tactical mission.

(1) FDCs of DS battalions perform tactical fire direction to support the infantry regiment or other designated unit; e.g., separate battalion. The FDCs of these battalions assist the infantry regimental FSCC in planning its supporting fires. Requests for reinforcing fires (**FM;CFF:X**) are transmitted to the regimental FDC which is established as the battalion FDC's default subscriber.

(2) R battalions augment the fires of the battalions they reinforce. The fire units of these battalions are controlled at the FDC of the reinforced battalion by the use of a center file and transmission of **FM;CFFs** to the FDC of the R battalion. The reinforced battalion FDC is established as the default subscriber of the R battalion.

(3) FDCs of GS battalions are controlled by the regimental FDC. The regimental FDC orders the fire units of these battalions with a lower value (i.e., higher priority) than other units. GSR battalions are ordered next, followed by DS battalions, and finally R battalions. The regimental FDC is established as the default subscriber of GS battalions.

(4) FDCs of GSR battalions augment the fires of the battalion they reinforce and answer calls for fire from the regimental FDC. The fire units of GSR battalions are controlled at the FDC of the battalion they reinforce by the use of a center file and transmission of **FM;CFFs** to the FDC of the GSR battalion. The regimental FDC orders GSR fire units under the **OWN NAME** of the GSR battalion with an ordering value greater than (i.e., of lower priority than) fire units of GS battalions but with a number less than (i.e., of greater priority than) fire units of DS battalions. The regimental FDC is established as the default subscriber of GSR battalions.

#### **b. Communications**

(1) **Nets.** The battalion FDC communicates on the nets described in paragraph 2002.

(2) **Message of Interest.** The battalion FDC establishes MOI files depending upon the battalion's mission as provided for in paragraph 2006a(4)(e).

(3) **PCLD Changes.** PCLD changes required from the default settings are described in paragraph 2006a(5).

**(4) Relay Subscriber.** The battalion FDC can access the following stations by relay communications:

- TPC on the Regt FD Net via the regimental FDC.
- Division FSCC on the Regt FD Net via the regimental FDC.

**c. Commander's Criteria**

<b>FM;MOD</b>	The FDCs of DS or R battalions establish the current, active <b>ZONE</b> of the supported regiment. GS and GSR battalions establish the current, active zone of the division. <b>IGNORE AMMO</b> is set to <b>NO</b> . <b>AUTOFF</b> is set to <b>YES</b> .
<b>FM;ATTACK</b>	The artillery battalion FDC enters the same attack method as the regimental FSCC based on the supported regimental commander's mission and concept of operations. The supported regimental FSCC updates this data by transmitting the <b>FM;ATTACK</b> messages to the artillery battalion FDC as required.
<b>FM;FUSEL</b>	Fire units are ordered under the battalion name to take a higher precedence in selection (i.e., ordered with a lower number) than those of a supporting R battalion. Fire units of GSR or R battalions are ordered under the name of their respective battalions.
<b>FM;XCLUDE</b>	No fire units are excluded as a matter of setup. Tactical and operational requirements may dictate exclusions during actual operations.
<b>FM;CENTER</b>	All batteries of the R battalion are assigned to a center file under that battalion's name.

## 3011. Firing Battery FDC

### a. Overview of Operations

The battery FDC performs technical fire direction for its howitzers and executes fire plans received from higher headquarters.

### b. Communications

(1) **Nets.** The battery FDC communicates on the nets described in paragraph 2002.

(2) **Relay Subscriber.** The battery FDC can access the following subscribers by using relay communications:

- Regimental FSCC on the COF net via the battalion FDC.
- Regimental FDC on the COF net via the battalion FDC.

### c. Operational Modes

The setup of the BCS will differ depending upon the operational mode.

(1) The FSCC Approval Mode requires the BCS operator to enter the battalion FDC's logical name in the **RPTAMMO** field of the **SYS;SETUP** message. This causes the BCS to automatically update the ammunition file of the station identified each time a mission is ended.

(2) The Centralized Mode requires the BCS operator to enter the battalion FDC's logical name in the **RPTAMMO** field of the **SYS;SETUP** message. This causes the BCS to automatically update the ammunition file of the station identified each time a mission is ended.

(3) The MEU Operations Mode requires the BCS operator to enter the battalion FSCC's logical name in the **RPTAMMO** field of the **SYS;SETUP** message.

### d. Geometry

The ability of the BCS to process and store support files is very limited. All geometry will be transmitted to the BCS along with all updates. The BCS only recognizes **SPRT;ZONE** and **SPRT;BGEOM** with a circular

restricted fire area (RFA) or forward line of own troops (FLOT). Other **SPRT;BGEOM** messages are received with an appended error message. These are printed and plotted.

## **3012. Forward Observer**

### **a. Overview of Operations**

The forward observer equipped with a DMS transmits calls for fire in support of his maneuver company. He inputs and forwards to the battalion FSCC the supported unit FLOT and nominates targets for inclusion into the target list. The observer uses **ATI** messages to report any target intelligence.

### **b. Communications**

**(1) Nets.** The FO communicates on the nets described in paragraph 2002.

**(2) Authentication Code Files.** Authentication files are established and assigned to any subscriber equipped with an LCU, BCT, or BCS, or for any subscriber that relays through these devices. These files are established by entering a serial number corresponding to the line number; e.g., at **CODE 02: \_\_**, enter **02**. These are interpreted by other computer devices as serial numbers.

**(3) FIST: YES/NO.** This setting is dependent on the operational mode and equipment used at the battalion FSCC.

**(a)** In the FSCC Approval Mode, the **FIST** field is set to **NO** and the battalion FSCC is entered as the **DFLT DEST** and the **FIST DEST**.

**(b)** In the Centralized Mode, the **FIST** field is set at **NO** and the battalion FDC is entered as the **DFLT DEST** and the **FIST DEST**.

**(c)** In the MEU Operations Mode, the **FIST** field is set to **NO** and the battalion FSCC is entered as the **DFLT DEST** and the **FIST DEST**.

### **c. Required Data Base Entries**

The FO will make the following entries in all modes of operation.

### (1) Initialization Menu

(a) **CONVERT:YES** is entered to convert "polar," "laser," and "shift" target locations to grids.

(b) **TOF VARIABLE** is determined to allow the DMS to compute "splash" time when TOF is received in the message to observer (MTO). **TOF VARIABLE** is computed by adding the net access delay for the maximum number of stations that the **FM;FOCMD** "shot" may be transmitted through plus two seconds for transmission; e.g., in the centralized mode, battery FDC net access time is 2 seconds, battalion FDC is 1 second, **TOF VARIABLE** is 5 (2+1+1).

(2) **Observer Location Menu.** The observer's current location must be on file. The following rules apply:

(a) The observer updates his location as soon as possible after moving and establishing a new position. This will be accomplished using the "locate observer" function of the DMS unless more accurate data is available.

(b) If the observer has not updated his location after moving, laser and polar target locations are not used.

(c) Observers will update locations when moving at time intervals specified by the controlling FSCC.

(d) When equipped with a laser, the observer will update cloud height and visibility at intervals established by the controlling FSCC.

(3) **Known Point File.** The observer stores all known points in the DMS known point files. This is a requirement to use **CONVERT:YES** to compute a grid and altitude for a "shift from known point" target location.

## Chapter 4

# Fire Mission Procedures

### 4001. General

Fire mission procedures are of special concern to all FDCs and FSCCs up through the regimental level. The automated environment requires precise and detailed procedures faithfully carried out by all stations to ensure timely fires and prevent fratricide.

### 4002. Modes of Operation

#### a. FSCC Approval Mode

The FSCC Approval Mode employs positive clearance of fire procedures (see page 8-10 of FMFM 6-9, *Marine Artillery Support*, and page 6-11 of FMFM 6-18, *Techniques and Procedures for Fire Support Coordination*). In this mode, the FO sends missions directly to his maneuver battalion FSCC. The battalion FSCC clears each mission and routes the mission to the artillery battalion FDC for tactical fire direction. The battalion FDC determines which units will fire, the volume of fire, and the shell/fuze to fire, and then routes the fire order to the appropriate firing battery. The battery executes the fire order and reports "ready," "shot," and "rounds complete" to the battalion FDC. Messages that do not involve tactical fire direction or coordination (e.g., MTOs, "ready," "shot," "rounds complete") are automatically routed through the system to the FO.

**(1) Advantages.** This mode keeps all stations in a direct loop. The FSCC filters coordination problems from the battalion FDC so that it can concentrate on tactical fire direction and control of the firing batteries. This mode ensures positive clearance of each and every fire mission and also best employs the communication equipment currently in the Marine Corps inventory. The maneuver battalion FSCC may be the only agency positioned to communicate with both the FO and artillery battalion FDC. This mode is also faster when there is a high volume of missions requiring coordination.

**(2) Disadvantages.** This mode is slower than other modes when the volume of missions requiring coordination is low. Additionally, several types of missions (e.g., final protective fires [FPF], illumination, Copperhead, and family of scatterable mines [FASCAM]) cannot be processed in this mode.

#### **b. Centralized Mode**

The Centralized Mode can support either positive or passive clearance of fire procedures. In this mode, the FO sends missions to the artillery battalion FDC. A MOI is automatically received at the maneuver battalion FSCC when the FDC's BCT operator enters the mission. When operating under positive clearance procedures, the FDC awaits clearance from the FSCC or, if the target is located beyond a permissive fire support coordination measure, proceeds to fire the mission. When operating under passive clearance procedures, the FDC proceeds with mission processing unless the FSCC denies clearance. Because of the operating speed of MCFSS, passive clearance procedures may not allow the FSCC sufficient time to assess and coordinate fire missions and thus should be employed with discretion. The firing battery FDC receives the fire order in the same manner as in the FSCC Approval Mode.

**(1) Advantages.** For a single mission, this method is faster than the FSCC Approval Mode. This method preserves all the artillery battalion FDC's tactical fire direction authority thus enabling the battalion to rapidly mass fires as required. If the battalion FSCC loses digital communications, the battalion FDC can still clear missions in this mode by voice.

**(2) Disadvantages.** This mode places a heavier coordination burden on artillery battalion FDCs. It may also be unrealistic to expect the FO to range the battalion FDC with a man-packed radio in all situations. Some communications relay may have to be established.

#### **c. MEU Operations Mode**

The MEU Operations Mode employs positive clearance of fire procedures. In this mode, the FO sends his call for fire to the maneuver battalion FSCC. The battalion FSCC processes the mission in the LCU, and the fire support coordinator (FSC) determines the fire support means to be used to attack the target. If the FSC clears the mission but selects a different, more appropriate weapon system to attack that particular target, he gives the

mission to the selected fire support agency while maintaining communications with the FO on the data communications net. If the FSC clears the mission and selects artillery to conduct the attack, the mission is transmitted to the firing battery FDC as a **FM;CFF:O**. In other modes of operation, the **FM;CFF:O** is considered a fire order and is, therefore, not altered at the battery FDC. In this mode, the fire order is a *recommended* fire order and may be altered by the battery fire direction officer. This enables the artillery commander on the scene to exercise tactical fire direction for each mission while still considering the FSCC's guidance.

**(1) Advantages.** This method should only be employed when the commander desires to dedicate a battery to a maneuver battalion, as in the BLT of a MEU. When a higher artillery headquarters is not available, this mode best exercises the capabilities of MCFSS. The only alternative for this situation is to transmit FO fire requests directly to the firing battery FDC. This would essentially exclude the battalion FSCC from the decisionmaking process, complicate clearance of fire procedures, and limit the ability to redirect the fire mission to other means which may be more effective for a given target.

**(2) Disadvantages.** This method gives a degree of the artillery commander's tactical fire direction authority to the battalion FSC.

### **4003. Common Aspects of All Modes**

Basic rules that apply to *all* fire mission processing modes are provided in this paragraph.

#### **a. Target Location**

All targets are transmitted as **FR GRID** missions from the DMS by selecting **CONVT:YES** in the DMS INIT screen and ensuring that all known points and observer locations are stored in the DMS.

#### **b. Altitudes**

Altitudes of grid missions are the responsibility of the battalion FDC (battery FDC if operating in the MEU Operations Mode). Missions passed through other devices are defaulted to the altitude of the first fire unit selected or the observer's altitude. The FDC will ensure the correct map-spotted altitude is entered.

### c. Replot

In terrain characterized by significant relief, replot grids and altitudes are required to accurately mass fires. See paragraph 4009c for detailed replot procedures.

## 4004. FSCC Approval Mode

### a. Required Data Base Changes

To enable fire missions to process in the FSCC Approval Mode, a number of changes must be made to the data bases.

(1) **Artillery Battalion FDC.** The battalion FDC deletes MOIs for each supported battalion FSCC for **FM;CFF**, **FM;QF**, and **FM;SUBS**.

(2) **Maneuver Battalion FSCC.** The battalion FSCC creates a **FM;CENTER** file by ordering and assigning all artillery fire units under the artillery battalion name. Organic mortars are ordered with a higher number; i.e., lower precedence for selection.

(3) **Infantry Regimental FSCC.** The regimental FSCC creates a **FM;CENTER** file by ordering and assigning all artillery fire units under the artillery battalion name. Organic mortars are excluded in the current plan.

### b. Limitations

(1) Because of the software design of the **FM;CENTER** file function, several missions cannot be fired using **FM;CENTER** file. The following missions require additional and more complex steps (see paragraph 4008):

- FPFs
- All missions firing shell illumination
- Copperhead missions
- FASCAM targets of opportunity

(2) Any mission ended with **EOMRAT** at the DMS causes that target to be stored as a known point at the computer that is first to receive the message. This causes a request to "record as target" to store the target at the maneuver battalion FSCC and not the artillery battalion FDC. Even if the known point is transmitted to the artillery battalion FDC, it may not be

assigned the same known point number by the receiving computer. This presents a problem for missions that must be processed through the battalion FDC (i.e., Copperhead, FASCAM, and illumination missions) located by shift from a known point method. To eliminate the effects of this problem —

- (a) The battalion FSCC displays the **FM;SUBS** with **EOM:X** and **RAT:K**, and then retransmits it to the battalion FDC by selecting **ACTION, XMIT**.
- (b) The battalion FSCC then selects **ACTION, ENTER** to end the mission. The fire mission chain is discarded.
- (c) The battalion FDC **ACTION, ENTERs** the **FM;SUBS**, ending the mission and recording the known point. A **FM;MTO** is generated to alert the FO of the assigned known point number. This **FM;MTO** is addressed to the maneuver battalion FSCC.
- (d) The battalion FSCC receives the **FM;MTO** in the alert queue and retransmits it to the FO, who stores the known point.
- (e) The FO, using **CONVT:YES**, transmits only grid locations of targets.

c. Generic Mission Flow

Figures 4-1 and 4-2 provide an example of the message flow for a fire mission requiring coordination processed in the FSCC Approval Mode.

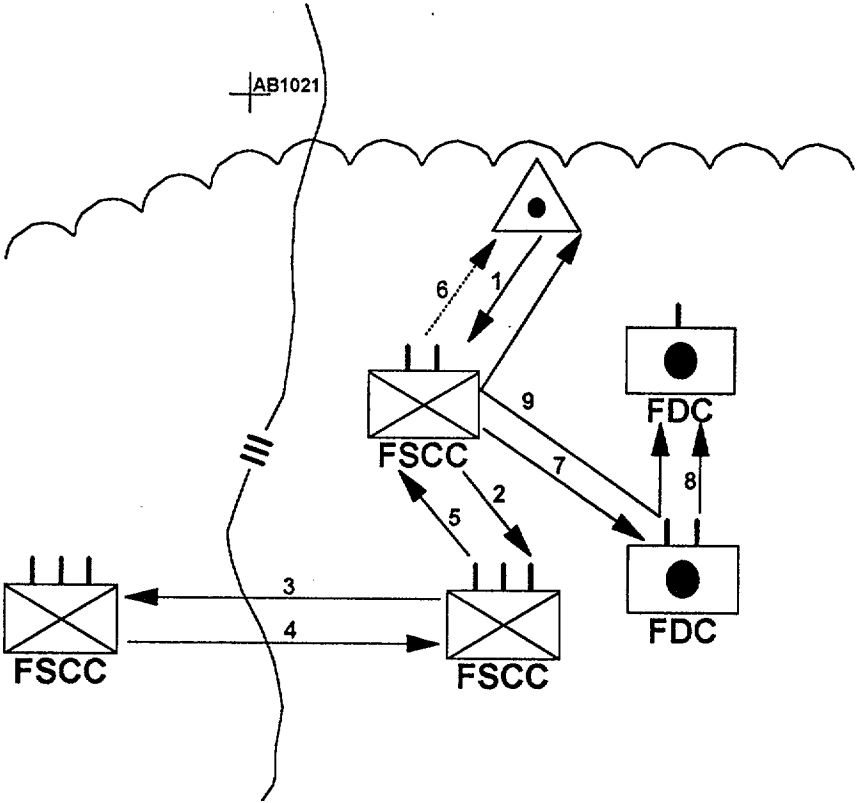


Figure 4-1. Message Flow for FSCC Approval Mode with Target Across Regimental Boundary

<b>AGENCY/ DEVICE</b>	<b>STEP (See figure 4-1)</b>	<b>REMARKS</b>
FO/DMS	1. FO locates target/requests fire from battalion FSCC.	FO composes and transmits the <b>FR</b> to battalion FSCC.
Battalion FSCC/LCU	2. If the mission requires coordination, battalion FSCC passes the <b>FM;CFF</b> to the affected FSCC.	Battalion FSCC actions received <b>FM;CFF</b> . As a result of <b>FM;CENTER</b> file processing, solution is <b>FM;CFF</b> addressed to battalion FDC. Battalion FSCC readdresses the <b>FM;CFF</b> to the affected adjacent battalion FSCC or to the regimental FSCC if target plots outside regimental zone. If clearance is denied, go to step 6.
Regimental FSCC/LCU	3. Regimental FSCC transmits <b>FM;CFF</b> to the affected FSCC.	Regimental FSCC actions received <b>FM;CFF</b> . The solution is <b>FM;CFF</b> addressed to battalion FDC as a result of <b>FM;CENTER</b> file processing. Regimental FSCC readdresses and transmits the <b>FM;CFF</b> to FSCC in whose zone the target plots.
Affected FSCC/LCU	4. Affected FSCC clears/denies the mission.	FSCC actions/plots mission and transmits clearance to regimental FSCC in a <b>SYS;PTM:_____</b> [target number] <b>CLEARED/DENIED</b> or by voice.
Regimental FSCC/LCU	5. Regimental FSCC passes clearance to battalion FSCC.	Regimental FSCC passes <b>CLEARED/DENIED</b> message by digital or voice communications.
Battalion FSCC	5A. Battalion FSCC acts on the clearance/denial.	If the mission is denied, go to step 6; if the mission is cleared, go to step 7.
Battalion FSCC/LCU	6. Battalion FSCC denies the mission to FO and deletes the mission.	Battalion FSCC discards all <b>FM;CFF</b> messages from the message chain of the denied mission. A <b>SYS;PTM:_____</b> [target number] <b>DENIED</b> or voice denial is transmitted to the FO.
Battalion FSCC/LCU	6A. Battalion FSCC deletes the mission.	Battalion FSCC uses <b>FM;CMD</b> message with option <b>DELETE</b> to clear fire mission from the file.
Battalion FSCC/LCU	7. Battalion FSCC transmits <b>FM;CFF</b> to battalion FDC.	LCU operator transmits <b>FM;CFF</b> as directed by the liaison officer (LnO) or liaison chief (LnChf).  <b>NOTE:</b> If <b>FM;CFF</b> was transmitted to regimental FSCC for clearance, fire mission chain must be regenerated to transmit <b>FM;CFF</b> to battalion FSCC. To do this, LCU operator redisplay fire mission chain by using <b>FM;CMD</b> message with option <b>EDIT</b> and target number.

**Figure 4-2. Message Flow Steps for FSCC Approval Mode**

AGENCY/ DEVICE	STEP (See figure 4-1)	REMARKS
Bn FDC/ BCT	8. Battalion FDC processes the fire mission.	Received <b>FM;CFF</b> is processed at the BCT and plotted. FSCM and boundary violations are ignored since receipt of mission from battalion FSCC indicates prior clearance. The fire mission chain is transmitted to send fire orders and MTO.
Battery FDC/ BCS	9. Battery FDC executes the <b>FM;CFF:O</b> .	The plot of the target is checked for safety, minimum quadrant violations, intervening crests, and accuracy in computer selection of charge and lot. If the mission is in <b>AMC</b> status, go to step 9A; if the mission is in <b>WR</b> status, go to step 9D.
Battery FDC/BCS	9A. Battery FDC passes "ready" to FO.	BCS operator passes "ready" to FO as directed by operations chief (OpsChf)/fire direction officer (FDO). <b>FM;FOCMD READY</b> is automatically addressed to battalion FDC. The message automatically prints and retransmits to the FO.
FO/DMS	9B. FO passes "fire" to battery FDC.	At appropriate time, FO transmits <b>COMMAND</b> message to battalion FSCC to fire the mission.
Battery FDC/BCS	9C. Battery fires mission at the FO's command.	As long as automatic authentication is specified at the BCS, the command to fire is automatically passed to gun display units (GDUs). Mission commands appear on BCS screen with mission marked by two blocks in the upper display.
Battery FDC/BCS	9D. Battery FDC passes "shot" to FO.	Battery FDC transmits the <b>FM;FOCMD</b> message with <b>SHOT</b> .
FO/DMS	9E. FO receives "shot."	The DMS alarm sounds and a solid square appears in the display's lower right corner to indicate receipt of a fire mission message. If time of flight was indicated in the MTO, the splash countdown appears in lower portion of display.
Battery FDC/BCS	9F. Battery passes "splash" to FO.	Battery FDC passes "splash" to FO only if one of the following conditions exists: <ul style="list-style-type: none"> <li>• Splash is requested.</li> <li>• Trajectory fired is high angle.</li> <li>• Observer is aerial observer (AO) or UAV.</li> </ul>
FO/DMS	10. FO passes corrections to battalion FSCC.	Cycle continues. Corrections that cross FSCMs or boundaries require additional coordination.

Figure 4-2 (continued). Message Flow Steps for FSCC Approval Mode

## **4005. Centralized Mode**

### **a. Required Data Base Changes**

To allow fire missions to process in the centralized mode, a number of changes must be made to the following data bases.

**(1) Artillery Battalion FDC.** The battalion FDC enters an MOI for each supported battalion FSCC for **FM;CFF**, **FM;SUBS**, and **FM;QF**. Action code is **I** (incoming); direction code is **B** (if from observers or zone) for **FM;CFF** and **FM;SUBS**, or **C** (if from observers) for **FM;QF**. The supporting FO's and the battalion FSCC's zone are associated with the MOI.

**(2) Maneuver Battalion FSCC.** The battalion FSCC creates a **FM;CENTER** file by ordering and assigning all artillery fire units under the DS artillery battalion name. Organic mortars and any assigned DS NSFS ship are ordered under the battalion FSCC's own name.

**(3) Infantry Regimental FSCC.** The regimental FSCC creates a **FM;CENTER** file by ordering and assigning all artillery fire units under the DS artillery battalion name. Organic mortars are excluded in the current plan.

### **b. Generic Mission Flow**

Figures 4-3 and 4-4 provide an example of the message flow for a fire mission processed in the centralized mode.

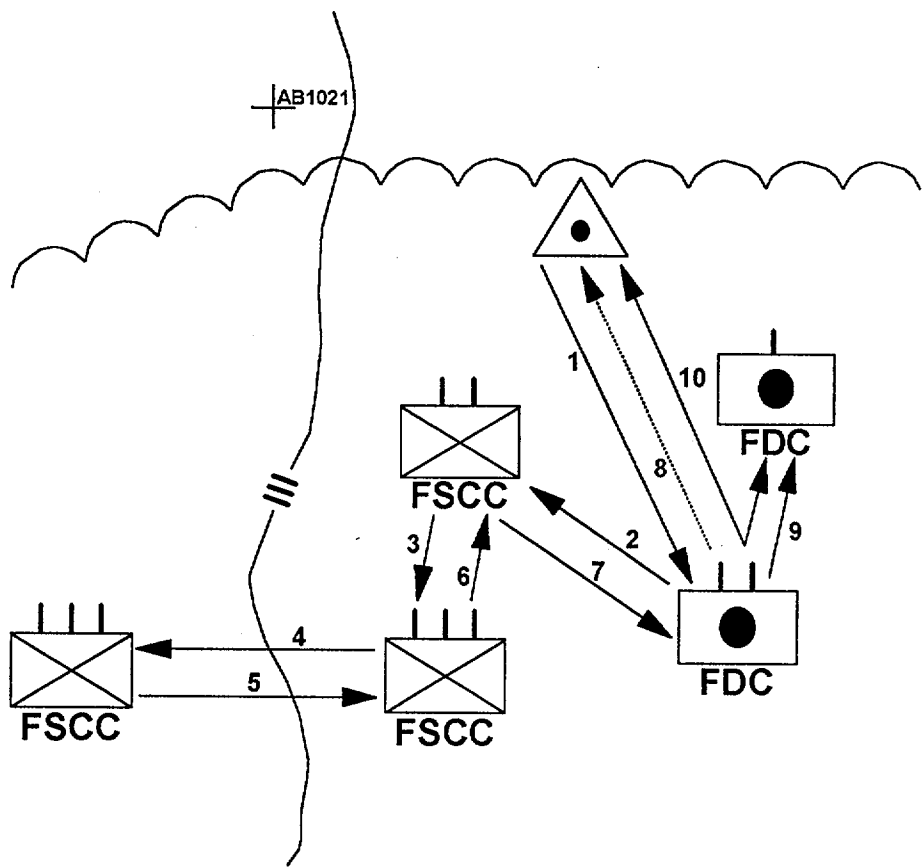


Figure 4-3. Message Flow for Centralized Mode with Target Across Regimental Boundary

AGENCY/ DEVICE	STEP (See figure 4-3)	REMARKS
FO/DMS	1. FO locates target/requests fire from battalion FDC.	FO composes and transmits the <b>FR</b> to the battalion FDC.
Battalion FDC/BCT	2. Battalion FDC passes the <b>FM;CFF</b> to the battalion FSCC for clearance.	The message is passed from battalion FDC to battalion FSCC via MOI processing established at battalion FDC. Battalion FSCC may approve the mission, assign the mission to another fire support means, or seek clearance.
Battalion FSCC/LCU	3. If the mission requires coordination, battalion FSCC passes the <b>FM;CFF</b> to the affected FSCC. <b>FM;CFF:Os</b> are not transmitted to firing batteries until the mission is approved.	Battalion FSCC actions the received <b>FM;CFF</b> . The solution is a <b>FM;CFF</b> addressed to battalion FDC as a result of <b>FM;CENTER</b> file processing. Battalion FSCC readdresses the <b>FM;CFF</b> and transmits it to the affected sister battalion FSCC or regimental FSCC for targets outside the regimental zone. If clearance is denied by a sister battalion FSCC, go to step 8.
Regimental FSCC/LCU	4. Regimental FSCC transmits the <b>FM;CFF</b> to the affected FSCC.	Regimental FSCC actions the received <b>FM;CFF</b> . The solution is a <b>FM;CFF</b> addressed to battalion FDC as a result of <b>FM;CENTER</b> file processing. Regimental FSCC readdresses/transmits <b>FM;CFF</b> to the FSCC in whose zone the target plots.
Affected FSCC/LCU	5. Affected FSCC clears/denies the mission.	Affected FSCC actions/plots the mission. Clearance is transmitted in <b>SYS;PTM:_____</b> [target number] <b>CLEARED/DENIED</b> or by voice to regimental FSCC.
Regimental FSCC/LCU	6. Regimental FSCC passes clearance to battalion FSCC.	Regimental FSCC passes <b>CLEARED/DENIED</b> message by digital or voice communications.
Battalion FSCC/LCU	7. Battalion FSCC passes clearance/denial to battalion FDC.	Battalion FSCC passes the <b>CLEARED/DENIED</b> message by data or voice communications. If the mission is denied, go to step 8; if the mission is cleared, go to step 9.
Battalion FDC/BCT	8. Battalion FDC denies the mission to the FO.	Battalion FDC discards all <b>FM;CFF:O</b> messages from the message chain of the denied mission. A <b>SYS;PTM:MSN#_____</b> [1 or 2] <b>DENIED</b> is transmitted to the FO. (DMS does not recognize <b>FM;MTO</b> method of engagement field <b>DENIED</b> .)

Figure 4-4. Message Flow Steps for Centralized Mode

AGENCY/ DEVICE	STEP (See figure 4-3)	REMARKS
Battalion FDC/BCT	8A. Battalion FDC deletes the mission.	Fire mission is cleared from fire mission files using <b>FM;COMD</b> message with option <b>DELETE</b> .
Battalion FDC/BCT	9. Battalion FDC transmits fire orders to the batteries.	BCT operator transmits <b>FM;CFF:O(s)</b> to fire unit(s) when directed by the OpsChf/FDO.
Battery FDC/BCS	10. Battery FDC executes the <b>FM;CFF:O</b> .	Target plot is checked for safety, minimum quadrant violations, intervening crests, and accuracy in computer selection of charge and lot. If mission is in <b>AMC</b> status, go to step 10A; if mission is in <b>WR</b> status, go to step 10D.
Battery FDC/BCS	10A. Battery FDC passes "ready" to FO.	BCS operator passes "ready" to FO as directed by the OpsChf/FDO. <b>FM;FOCMD READY</b> is automatically addressed to battalion FDC, where it automatically prints and retransmits to FO.
FO/DMS	10B. FO passes "fire" to battery FDC.	At appropriate time, FO transmits <b>COMMAND</b> message to battalion FDC to fire the mission.
Battery FDC/BCS	10C. Battery fires mission at FO's command.	As long as automatic authentication is specified at BCS, the command to fire is automatically passed to GDUs. Mission commands appear on BCS screen with mission marked by two blocks in the upper display.
Battery FDC/BCS	10D. Battery FDC passes "shot" to FO.	Battery FDC transmits the <b>FM;FOCMD</b> message with <b>SHOT</b> .
FO/DMS	10E. FO receives "shot."	DMS alarm sounds and a solid square appears in the lower right corner of the display to indicate receipt of fire mission message. If time of flight was indicated in the MTO, the splash countdown appears in lower portion of display.
Battery FDC/BCS	10F. Battery FDC passes "splash" to FO.	Battery FDC passes "splash" to FO only if one of the following conditions exists: <ul style="list-style-type: none"> <li>• Splash is requested.</li> <li>• Trajectory fired is high angle.</li> <li>• Observer is an AO.</li> </ul>
FO/DMS	11. FO passes corrections to battalion FDC.	Cycle continues. Corrections that cross FSCMs or FSCMs require additional coordination.

Figure 4-4 (continued). Message Flow Steps for Centralized Mode

## **4006. MEU Operations Mode**

### **a. Required Data Base Changes**

To allow fire missions to process in the decentralized mode, a number of changes must be made to the following data bases.

**(1) Firing Battery FDC.** The battery FDC enters the battalion FSCC's logical name in the **RPTAMMO** field of the **SYS;SETUP** message.

**(2) Maneuver Battalion FSCC.** The battalion FSCC orders the firing battery, any NSFS ship, and the organic mortar platoon under the battalion FSCC's own name. The ordering values depend upon mission and commander's criteria. The battalion FSCC enters an MOI for the MAGTF FFCC for **FM;CFF**, **FM;SUBS**, and **FM;QF**. Action code is **I** (incoming) and direction code is **A** (always).

**(3) MEU FFCC.** The MEU FFCC creates a **FM;CENTER** file by ordering and assigning all artillery fire units under the artillery name. Organic mortars are excluded in the current plan.

### **b. Selecting the Means to Attack the Target**

The maneuver battalion FSCC is not involved in tactical fire direction; however, it will process incoming calls for fire to decide the appropriate means for attack of the target. If a fire support means other than artillery is selected, the representative from that agency is given the mission. Communications may be maintained with the requestor on the data net or he may be directed to another net for this mission.

### **c. Generic Mission Flow**

Figures 4-5 and 4-6 provide an example of the message flow for a fire mission processed in the MEU Operations Mode.

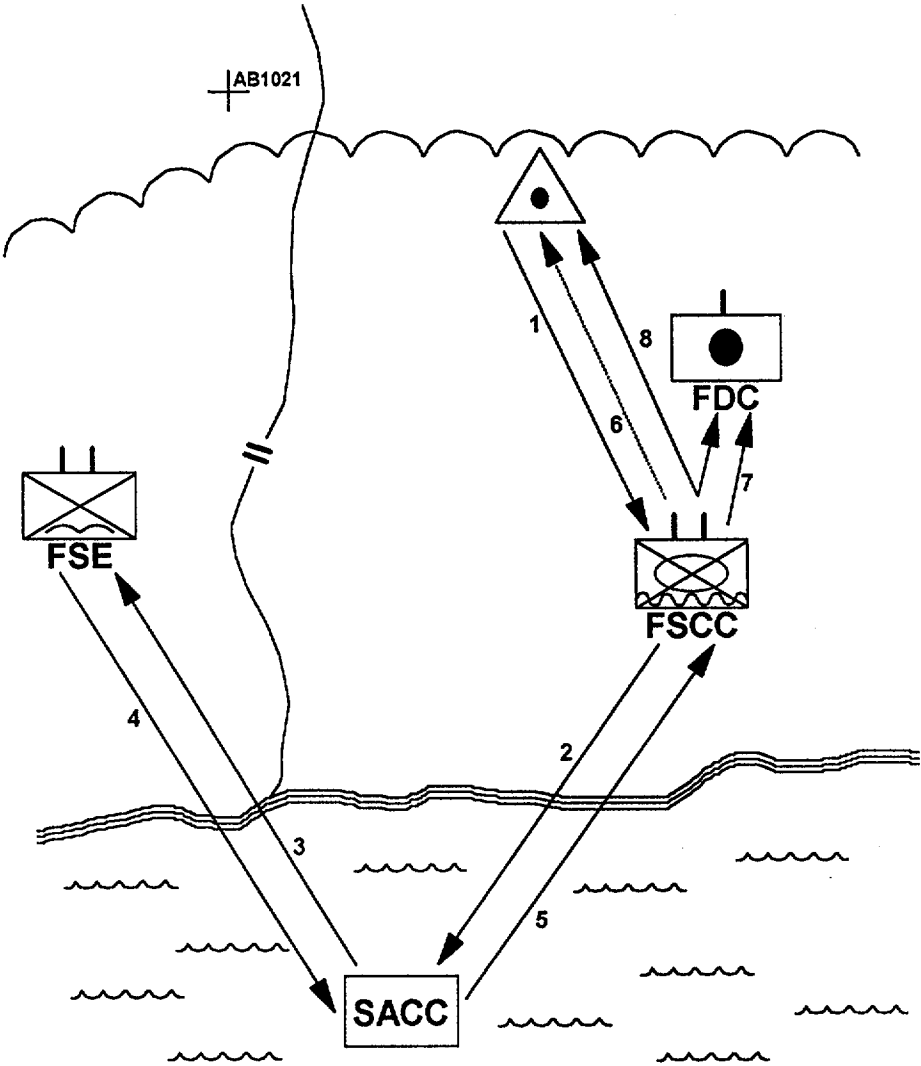


Figure 4-5. Message Flow for MEU Operations Mode

AGENCY/ DEVICE	STEP (See figure 4-5)	REMARKS
FO/DMS	1. FO locates a target.	FO composes/transmits <b>FR</b> to battalion <b>FSCC</b> .
Battalion FSCC/LCU	2. If mission requires coordination, battalion <b>FSCC</b> passes <b>FM;CFF</b> to <b>SACC/MEU FFCC</b> .	Battalion <b>FSCC ACTION</b> , <b>ENTERS</b> the <b>FM;CFF</b> . Target is plotted and transmitted to <b>SACC/MEU FFCC</b> via <b>MOI</b> processing. Battalion <b>FSCC</b> may — <ul style="list-style-type: none"> <li>• Approve the mission.</li> <li>• Assign the mission to another available fire support means (see paragraph 4006b).</li> <li>• Request clearance outside the battalion zone by transmitting a <b>SYS;PTM</b>.</li> </ul>
SACC- MEU FFCC/LCU	3. <b>SACC/MEU FFCC</b> plots the mission and determines if the mission requires coordination outside the <b>MEU</b> zone or if the attack should be conducted with means not immediately available to battalion <b>FSCC</b> .	<b>SACC/MEU FFCC</b> actions the received <b>FM;CFF</b> . Solution is <b>FM;CFF</b> addressed to battalion <b>FSCC</b> as a result of <b>FM;CENTER</b> file processing. <b>SACC/MEU FFCC</b> may assign another fire support means and notify the <b>FSCC</b> by voice or <b>SYS;PTM</b> . If another fire support means is not assigned and the mission lies outside the amphibious objective area ( <b>AOA</b> ), the <b>SACC/MEU FFCC</b> seeks clearance by voice communications with the affected force.
SACC- MEU FFCC/LCU	4. <b>SACC/MEU FFCC</b> passes the clearance to battalion <b>FSCC</b> .	<b>SACC/MEU FFCC</b> passes the <b>CLEARED/DENIED</b> message by <b>SYS;PTM</b> : _____ [target number] <b>CLEARED/DENIED</b> or by voice communications. If the mission is denied, go to step 5; if the mission is cleared, go to step 6.
Battalion FSCC/LCU	5. Battalion <b>FSCC</b> denies the mission to <b>FO</b> .	Battalion <b>FSCC</b> transmits denial as a <b>SYS;PTM</b> : _____ [target number, mission number] <b>DENIED</b> .
Battalion FSCC/LCU	5A. Battalion <b>FSCC</b> ends the mission.	The <b>LCU</b> operator completes and executes a <b>FM;SUBS</b> with <b>EOM:X</b> .
Battalion FSCC/LCU	6. Battalion <b>FSCC</b> transmits call for fire to battery <b>FDC</b> .	Battery <b>FDC</b> receives the <b>FM;CFF:O</b> . Solution, based on commander's criteria, is presented to battery <b>FDO</b> . Battery <b>FDO</b> may elect to alter solution to perform tactical fire direction. If mission is in <b>AMC</b> status, go to step 6A; if the mission is in <b>WR</b> status, go to step 6D.

Figure 4-6. Message Flow Steps for MEU Operations Mode

AGENCY/ DEVICE	STEP (See figure 4-5)	REMARKS
Battery FDC/BCS	6A. Battery FDC passes "ready" to FO.	The BCS operator passes "ready" to the FO when directed by the OpsChf/FDO. The <b>FM;FOCMD READY</b> is automatically addressed to the FO.
FO/DMS	6B. FO passes "fire" to battery FDC.	At appropriate time, FO transmits a <b>COMMAND</b> message to battery FDC to fire mission.
Battery FDC/BCS	6C. Battery fires mission at the FO's command.	As long as automatic authentication is specified at the BCS, the command to fire is automatically passed to GDUs. Mission commands appear on BCS screen, and mission is marked by two blocks in the upper display.
Battery FDC/BCS	6D. Battery FDC passes "shot" to FO.	Battery FDC transmits the <b>FM;FOCMD</b> message with <b>SHOT</b> .
FO/DMS	6E. FO receives "shot."	The DMS Alarm sounds and a solid square appears in the right corner of the display to indicate receipt of a fire mission message. If time of flight was indicated in the MTO, the splash countdown appears in lower portion of display.
Battery FDC/BCS	6F. Battery FDC passes "splash" to FO.	Battery FDC passes "splash" to FO only if one of the following conditions exists: <ul style="list-style-type: none"> <li>• Splash is requested.</li> <li>• Trajectory fired is high angle.</li> <li>• Observer is an AO.</li> </ul>
FO/DMS	7. FO passes subsequent corrections to battalion FSCC.	Cycle continues. Corrections that cross FSCMs or boundaries require additional coordination.

Figure 4-6 (continued). Message Flow Steps for MEU Operations Mode

## 4007. Special Missions

### a. Copperhead

Firing the M712 Copperhead projectile is accomplished using one of the two following procedures.

**(1) Copperhead Targets of Opportunity.** These missions require rapid communications between the firing battery and observer. Because of this, the BCT/LCU will not process the mission through a **FM;CENTER** file and these targets must be processed at the battalion FDC.

**(2) Copperhead Priority Target Missions.** These missions are established using **ASSIGN FPF** and specifying Copperhead munitions.

**(3)** In either mission, the **FM;MTO** is generated at the firing battery FDC's BCS. The **CPRHD** of the **FM;MTO** field contains three subfields which contain information the observer needs to orient the Copperhead footprint:

- [1]** Direction, **L** (left), **R** (right), or **O** (on line), of the gun-target (GT) line compared to the observer-target (OT) line.
- [2]** Angle T expressed in hundreds of mils.
- [3]** GT range expressed in hundreds of meters.

<p><b>NOTE:</b> The DMS receives <b>[1]</b> and <b>[2]</b> as angle T and <b>[3]</b> as probable error in</p>
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### b. FASCAM Targets of Opportunity

FASCAM targets are processed in a procedure similar to Copperhead missions. FASCAM missions will not process through **FM;CENTER** files at the BCT or LCU. Therefore, the **FM;CFF** must be transmitted to the battalion FDC. The same routing applies as for the Copperhead mission except the designate command is not required. In addition, the BCT or LCU will generate a **SPRT;BGEOM** containing the corner grids of the FASCAM danger zone in the form of a laid FASCAM safety zone (**LFSZ**). If the mission is fired from the BCS, the safety zone must be manually plotted and forwarded to the FSCC in whose zone the mission plots.

### c. Illumination

Illumination missions cannot be processed through a **FM;CENTER** file. This requires that any mission requesting illumination be processed at the battalion FDC. In addition, the synchronized effort required to mark and coordinate illumination fires with shell high explosive (HE) makes coordinated illumination missions difficult to control from the FDC.

(1) To process coordinated illumination, use one of the following options:

- (a) Process the marking and firing of illumination using traditional voice procedures.
- (b) Direct the FO to control the timing and command "fire" for both HE and illumination.

(2) If coordinated illumination is requested in the initial call for fire, the BCT/LCU or BCS will generate two **FM;CFFs**, but only if fire units not assigned to centers are available for selection. The first **FM;CFF** is for the illumination target; the second for the HE target. If **FM;CENTER** files exist, the mission is not placed in the fire mission file. The following options can be used to process coordinated illumination missions:

- (a) Use two separate missions and do not specify coordinated illumination in the illumination **FM;CFF**. Specific procedures associated with this option are —
  - The observer composes and transmits the request for illumination as an illumination only mission vice a coordinated illumination mission.
  - When the observer desires to fire coordinated illumination, the HE mission is transmitted as a separate fire mission.
  - If the FO controls the firing of both missions (the recommended procedure), the missions are transmitted as **AMC** (at my command) fire missions. If the FDC is to control the firing, the observer precedes the HE mission with a text message: **SYS;PTM CRI \_\_\_\_\_** [target number of the illumination mission] **FOLLOWS**.
  - If the firing is controlled from the FDC, the observer marks the illumination or transmits a **FM;FOCMD** message with **DESIG**

(designate). If the **FM;FOCMD** message is used, the message is transmitted approximately 10 seconds early to account for transmission delays.

- If the firing is controlled by the observer, he transmits a **FM;FOCMD** message at the appropriate time for each mission.

**(b) Specify coordinated illumination in the illumination FM;CFF:**

- Process the illumination mission, while sending the associated HE mission to the battery FDC in a **DNL** (do not load) status (accomplished by modifying the **FM;CFF:O**).
- Have the observer transmit the first HE correction as the shift required to move the original illumination target location to the actual HE target location.

## **4008. Special Mission Processing**

The following procedures apply based on the mode of operation.

### **a. FSCC Approval Mode**

Special missions are not processed in the FSCC approval mode due to problems already noted in **FM;CENTER** files. These missions will be processed through the battalion FDC. Since MOIs for **FM;CFF** are not transmitted from the artillery battalion FDC to the maneuver battalion FSCC in the FSCC Approval Mode, coordination of fire missions received directly at the battalion FDC is performed using **SYS;PTM** messages or voice communications.

### **b. Centralized Mode**

This is the preferred method for processing special missions. Figure 4-7 illustrates the message flow for processing special missions in the Centralized Mode and additional steps for processing when the FSCC Approval Mode is used for normal fire missions.

### **c. MEU Operations Mode**

This processing mode presents no unique problems for special missions, processing them in the same manner as other missions.

AGENCY/ DEVICE	STEP	REMARKS
FO/DMS	1. FO locates a target and transmits fire request to battalion FDC.	FO composes/transmits <b>FR</b> to battalion FDC. Any method of target location is legal. FFE shell <b>CPRHD</b> , <b>ILLUM</b> , or <b>MINE</b> is specified or <b>PRIORITY:ASSIGN FPF</b> is used.
Battalion FDC/BCT	2. Battalion FDC requests clearance from battalion FSCC.	BCT operator completes <b>SYS;PTM</b> with target number, six digit grid, munitions in effect, and <b>REQ CLR</b> , and transmits this to battalion FSCC.  <b>NOTE:</b> If all fire missions are being processed in the Centralized Mode, a <b>FM;CFF</b> is transmitted via MOI to battalion FDC. Battalion FSCC then retransmits <b>FM;CFF</b> in place of <b>SYS;PTM</b> to request further coordination.
Battalion FSCC/LCU	3. If the mission requires coordination, battalion FSCC requests clearance from regimental FSCC.	Battalion FSCC manually plots grid received in the <b>SYS;PTM</b> . If further coordination is required, the received <b>SYS;PTM</b> is readdresses and transmitted to regimental FSCC.
Regimental FSCC/LCU	4. Regimental FSCC transmits <b>SYS;PTM</b> to affected FSCC.	Regimental FSCC plots received target, readdresses received <b>SYS;PTM</b> , and transmits it to the FSCC in whose zone the target plots.
Affected FSCC/LCU	5. Affected FSCC clears/denies the mission.	Affected FSCC plots mission. <b>SYS;PTM</b> is changed from <b>REQ CLR</b> to <b>CLEARED</b> or <b>DENIED</b> and transmitted to regimental FSCC.
Regimental FSCC/LCU	6. Regimental FSCC passes clearance to battalion FSCC.	Regimental FSCC passes the <b>CLEARED/DENIED</b> message by data or voice communications.
Battalion FSCC/LCU	7. Battalion FSCC passes clearance/denial to battalion FDC.	Battalion FSCC passes the <b>CLEARED/DENIED</b> message by data or voice communications. If the mission is denied, go to step 8; if the mission is cleared, go to step 9.
Battalion FDC/BCT	8. Battalion FDC denies the mission to FO.	Battalion FDC changes ___ [target number] to ___ [mission number] and transmits <b>SYS;PTM</b> .

Figure 4-7. Special Mission Processing Steps in Centralized Mode

AGENCY/ DEVICE	STEP	REMARKS
Battalion FDC/BCT	8A. Battalion FDC deletes mission.	FM;SUBS with EOM:YES is received. Battalion FDC enters FM;SUBS and deletes EOM FM;SUBS.
Battalion FDC/BCT	9. Battalion FDC transmits FM;CFF:O and FM;MTO.	Battery FDC processes mission as any other area fire mission.
Battery FDC/BCS	10. Battery FDC executes the FM;CFF:O.	Target plot is checked for safety, minimum quadrant violations, intervening crests, and accuracy in computer selection of charge and lot. If mission is in AMC status, go to step 10A, if mission is in WR status, go to step 10D.
Battery FDC/BCS	10A. Battery FDC passes "ready" to FO.	BCS operator passes READY to FO as directed by the OpsChf/FDO. FM;FOCMD READY is automatically addressed/retransmitted to FO.
FO/DMS	10B. FO passes "fire" to battalion FDC as required.	At appropriate time, FO transmits a COMMAND message to battalion FDC to fire mission.
Battalion FDC/BCT	10C. Battalion FDC fires mission at FO's command.	FOCMD is transmitted automatically to the BCS.
Battery FDC/BCS	10D. The battery FDC passes "shot" to the observer.	As long as automatic authentication is specified at the BCS, the command to fire is automatically passed to GDUs. Mission commands appear on BCS screen with mission marked by two blocks in the upper display. Battery FDC transmits the FM;FOCMD message with SHOT.
FO/DMS	10E. The observer receives "shot."	The DMS alarm sounds and a solid square appears in the display's lower right corner to indicate receipt of fire mission message. If time of flight was indicated in the MTO, the splash countdown appears in lower portion of display.
Battery FDC/BCS	10F. Battery FDC passes "designate" to FO for Copperhead mission.	Battery FDC changes SPLASH to DESIG in the FM;FOCMD. FDC transmits this command immediately after firing.
FO/DMS	11. FO passes corrections to battalion FDC.	FO passes subsequent corrections or EOM to battalion FDC.

Figure 4-7 (continued). Special Mission Processing Steps in Centralized Mode

## 4009. Special Procedures

### a. Final Protective Fires

FPFs must be processed using the work-around shown in figure 4-8 because of software incompatibilities in the BCT/LCU program.

ACTION	REMARKS
1. FO - Transmit a digital request to establish FPF.	FO sends <b>SYS;PTM</b> requesting an adjusted or unadjusted FPF.
2. Battalion FDC - Associate FO with a fire unit.	Use <b>FM;QF</b> with option <b>UPDATE</b> to associate desired fire unit and FO.
3. FO - Transmit <b>FR</b> .	<p>Compose <b>FR</b> using any method of target location. Enter the following —</p> <ul style="list-style-type: none"> <li>• <b>TGT LOCATION</b></li> <li>• <b>SIZE = [1]</b> 30 meters per number of pieces in 105mm fire unit; 50 meters per number of pieces in 155mm fire unit</li> <li style="padding-left: 40px;"><b>[2]</b> enter 50</li> <li>• <b>ATTITUDE</b> enter attitude of <b>FPF SHEAF</b>, 0-3199 mils.</li> <li>• <b>PRIORITY</b> - assign FPF.</li> </ul> <p><b>NOTE:</b> For an adjusted FPF, go to step 4; for an unadjusted FPF go to step 10.</p>
4. Battalion FDC - Process call for fire.	Battalion FDC processes <b>FM;CFF</b> . Ensure <b>SIZE [2]</b> is less than 1/5 of <b>SIZE [1]</b> . For a 105mm FPF, the FDC must modify the entry because the smallest entry the DMS can transmit is 50 meters.
5. Process the adjustment.	Adjustment is processed as any area fire mission.
6. FO - Transmit refinement.	FO transmits <b>SYS;PTM</b> with <b>TGT: _____</b> , <b>REFINEMENT FOLLOWS</b> . Refinement is then transmitted in <b>SUBS ADJ</b> message.

Figure 4-8. Mission Processing Steps for FPF

ACTION	REMARKS
7. Battalion FDC - Process refinement.	Enter <b>DNL</b> as method of engagement and <b>DO NOT FIRE</b> in <b>PTM</b> field of <b>FM;SUBS</b> . Transmit to battery FDC. (This step is required because the BCT is designed to store targets and transmit <b>EOM</b> . Refinement is lost at the BCT if <b>EOM:YES</b> is specified.)
8. Battery FDC - Process refinement.	Battery FDC observes <b>DNL</b> and <b>PTM</b> and executes refinement to move aimpoint to refined location.
9. FO - Transmit "end of mission."	FO transmits <b>EOM&amp;SURV</b> with <b>EOMRAT</b> .  <b>NOTE:</b> FPF can be fired by FO sending <b>FM;QF</b> requesting <b>FIRE FPF</b> or fired by the BCT operator using the FPF switch. Command will process automatically at the BCS and transmit to GDUs without operator action at the BCS.
10. Battalion FDC - Process fire request to establish FPF.	<b>FM;CFF</b> is processed as if it was an adjusted FPF. <b>FM;CFF:O</b> is modified so that the method of control is changed to <b>DNL</b> , and <b>PTM</b> field is entered with <b>DO NOT FIRE</b> . <b>FM;CFF:O</b> and <b>FM;MTO</b> are transmitted.
11. Battery FDC - Process the <b>FM;CFF</b> .	Battery FDC executes the <b>FM;CFF:O</b> but does not transmit the fire commands to the GDU.
12. FO - Transmits "end of mission."	FO transmits <b>EOM&amp;SURV</b> message with <b>EOMRAT</b> after receiving the <b>MTO</b> for the target.

Figure 4-8 (continued). Mission Processing Steps for FPF

### b. Registrations

Registrations are important to both FDCs and FSCCs. Because the conduct of a registration cannot be controlled through the BCT or LCU, a link between the observer(s) and the battery FDC must be established, and the following events must occur:

- (1) The battery OpsChf/FDO requests, or the battalion OpsChf/FDO decides, to register.

- (2) The battalion OpsChf/FDO selects the method of registration, observer(s), shell, charge, propellant, and fuze to register.
- (3) Communications with the observers is established. Preferably, an observer is selected who is on the same COF net as the battery. If the observer is on another net, the battalion FDC will establish the appropriate communications relay.
- (4) The battery FDC conducts the registration.
- (5) The battery FDC passes the registration corrections to the battalion FDC, where they are examined and passed to the battalion's batteries.
- (6) The battery FDC that conducted the registration is responsible for **MET**, **MV**, or survey updates of the **AFU;REG**. Updated **AFU;REGs** are transmitted to the battalion FDC.

**NOTE:** The method of registration depends on the available resources and tactical environment. The following considerations apply:

- Registration firing does not damage the enemy directly and possibly discloses the firing position.
- Radar registration is fast, requires few rounds, and is very reliable. It is also dependent upon the proficiency of the radar operator and battery FDC.
- High burst (HB) and mean point of impact (MPI) registrations require two observers equipped to measure the vertical angle to each burst. No surveyed registration point is required.
- Precision registration requires only one observer but also requires a surveyed registration point on common survey with the registering battery, and preferably the battalion.
- Abbreviated registration (precision registration procedures with less than two over and two short spottings and four airburst spottings, or radar/HB/MPI procedures with less than six usable rounds) can be used to shorten the registration if diminished assurance of validity is acceptable.

Lot to be registered, like all matters of technical fire direction, is left to the battery FDC. The registered lot should have an accurate muzzle velocity variant (MVV) on file or ready to be measured, to allow transfer of the **AFU;REG** to other unit. For a more complete explanation of registrations, see FMFM 6-22/TC 6-40, *Field Artillery Manual Cannon Gunnery*.

### c. Replot

**(1) Explanation.** Replot is required to mass fires in mountainous terrain. The replot procedure eliminates site error. This error occurs when the altitude determined at the initial target location varies from that at the actual target location. This error is corrected as an elevation correction, vice site correction, during adjustment. This displaces the adjusted target location in range. Since site (the actual error) varies with range, the unadjusted massing units suffer an error in point of impact equal to the error in site.

**(2) Procedure.** BCT/LCU software is not designed to allow for the performance of replot. However, the BCS will perform replot based on successive approximation. The following procedure allows replot to be performed at the direction of the battalion FDO/OpsChf.

ACTION	REMARKS
1. Battalion FDC processes adjustment phase of area fire mission.	During adjustment, the decision is made to replot.
2. FO transmits an FM;SUBS requesting fire for effect.	Battalion FDC discards all segments of the fire mission chain except the FM;CFF:O for the adjusting battery. Method of control is changed to DNL and PTM:RELOT is entered. FM;CFF:O is transmitted to battery FDC.
3. Battery FDC processes the replot.	<p>BCS operator notes the PTM: field. Replot is processed on the adjusted location.</p> <ul style="list-style-type: none"> <li>• Conduct replot until two successive target altitudes are determined within one half the contour interval of the map.</li> <li>• Execute the FM;CFF with the final altitude, RELOT:X, and record the target location and altitude. BCS transmits EOM to GDUs as soon as replot FM;CFF is executed. This does not stop processing. Fire for effect or repeat fire for effect appears as a new mission to GDUs.</li> <li>• Execute EOM to store target.</li> <li>• Select target FM;CFF from data base, enter fire order entries from the mission, CONT:DNL/FFE, and execute.</li> <li>• Transmit FM;CFF to battalion FDC.</li> <li>• Transmit DNL fire commands to guns.</li> </ul>
4. Battalion FDC processes fire for effect on replot grid.	<p>Battalion FDC BCT operator notes reception of replot FM;CFF and —</p> <ul style="list-style-type: none"> <li>• Deletes fire mission from fire mission file by use of FM;CMD message.</li> <li>• Enters fire order entries and executes FM;CFF received from battery FDC. Fire mission chain reflects same mission number but in form of FM;CFF.</li> <li>• Converts FM;CFF mission chain to FM;SUBS acceptable to BCSs by executing FM;SUBS with no correction. This produces fire mission chain to mass on replot grid.</li> </ul>

**Figure 4-9. Message Processing Steps for Replot**

**4010. Fire Mission Processing at Regimental FDC**

The **FM;CFF:X** received at regimental FDC will not process if recalculated. The following procedures will be used.

- a. The **FM;CFF** is entered as **DISPLAY:YES** in the PCLD of the regimental FDC's BCT.
- b. Received fire missions are plotted. A voice fire order is issued and appropriate entries are made in the **FM;CFF**.
- c. The **FM;CFF** is actioned and the solution is transmitted to the battalion FDCs.

(reverse blank)

## **Chapter 5**

# **Artillery Target Intelligence**

### **5001. General**

The **ATI** program allows the **BCT/LCU** to manage the target file for the purpose of counterfire and fire planning. The **ATI** function provides for the following:

- Storage, search, and retrieval of targets.
- Elimination of duplications in the target file by combination.
- Input of fire mission criteria to generate fire missions on high payoff targets (**HPTs**).
- Rejection of targets older than established set time criteria.
- Predicted hostile weapons locations based on intersections of rays generated by shell reports.

### **5002. Modes Of Operation**

The **ATI** program provides for a **BCT/LCU** to be established in one of three modes of operation. The mode may be altered at any time during operations should the situation require it.

#### **a. ATI MODE 1**

Operations in this mode are the most limited of the modes. The computer can input **ATI** reports of targets or enemy activity, search the target files of another **BCT/LCU**, and establish **SRIs**. Received **ATI** reports are stored at the computer only if they are marked **RECORD AS TARGET**.

#### **b. ATI MODE 2**

Operations in this mode provide the same capabilities as **ATI MODE 1** except any **ATI;CDR**, **ATI;SHR**, **ATI;AZR**, **ATI;MFR**, or **AFU;MFR** are automatically transmitted to the default address when these messages are actioned.

### c. ATI MODE 3

Operations in this mode allow complete ATI processing. All ATI reports are stored as targets.

## 5003. Concept of ATI Operations

The **ATI MODE 3** function allows the computer to maintain a data base of targets. Because the program also combines targets and generates fire missions, it is inefficient and redundant to store the targets in each BCT/LCU. Only three stations will operate in **ATI MODE 3**. These are the MAGTF FFCC, the ground combat element (GCE) FSCC, and the TPC. The MOI setup detailed in chapter 2 causes **ATI;CDRs**, **ATI;AZRs**, **ATI;MFRs** and **AFU;MFRs** to be forwarded to the GCE FSCC when received and entered at any station. The target file for the entire force is resident at the GCE FSCC. The MAGTF FFCC stores those targets that are forward of the fire support coordination line (FSCL). The TPC and regimental FDC establish SRIs to receive counterfire targets (i.e., **ARTY/NOT GIVEN**, **MORT/NOT GIVEN**, **RKTMSL/NOT GIVEN**, **SUPPLY/AMMO**, **EQUIP/RADAR**, and **PERS/O**) with target storage at the TPC. **ATI;SHRs** transmitted through the system are routed to the TPC as a result of MOI and **ATI MODE 2** processing at subordinate stations.

## 5004. Establishing Automated Target Processing Criteria

To ensure efficient functioning of the ATI system, it is imperative that proper modification file criteria is established to support the commander's concept of operations. Appendix D contains a detailed explanation of the procedures used to translate the products of the targeting process into numerical values for the ATI mod file.

### a. ATI Criteria at the GCE FSCC

Much of the ATI criteria are dependent upon the tactical situation. Some specific entries are required in all situations.

(1) The **ATI;FMMOD** message controls the output of fire missions from the ATI function. The division FSCC makes the following specific entries:

(a) **INITIATE FIRE MISSION BASED ON: ALL TGT RPTS** causes the computer to examine all incoming **ATI** reports (except **ATI;MFR**, **ATI;SVL**, and **ATI;CBTI**) as possible fire missions.

(b) The remaining entries in the **ATI;FMMOD** message are based on the tactical situation.

(2) The **ATI;SVMOD** message controls the combination of targets and the time criteria for rejection of target data. All entries are mission and situation dependent.

(3) **ATI;TBMOD** controls the output of **TARGET BUILDUP REPORTS**. The target buildup report indicates intense enemy activity. The number of targets constituting a buildup are entered in the **ATI;TBMOD** message based on the tactical situation.

(4) **ATI;DPMOD** controls the output of less important printed reports. Reports critical to **ATI** operation (e.g., combination reports, search reports) are not controlled by the **DPMOD** message. Specific reports are printed at the supervisor's discretion. If the system is overloaded with printer output, this may be progressively reduced by not printing certain reports. The following is an ordered list for reduction of printer output:

- **IN FAN** reports
- **INCOMPATIBILITIES** reports
- **RECOMMENDED FOR INSPECTION** reports
- **RECOMMENDED FOR COMBINATION** reports
- **CONSTITUENTS** reports

(5) The **ATI;STAT** message allows the computer operator to alter the report accuracy, and range and location error tables for target acquisition agencies. This message should not be used unless experience indicates a particular type of target acquisition agency has a capability different from that indicated in the default accuracy or error tables.

#### **b. ATI Criteria at the TPC**

The **ATI** modification file data at the TPC is identical to that established at the GCE FSCC, except for the following.

(1) The **ATI;FMMOD** message **INITIATE FIRE MISSION BASED ON: SOLUTION REPORTS ONLY** prevents the TPC computer from duplicating a fire mission generated at the division FSCC when the same report is received by the TPC via SRI. Only those targets that combine with existing targets and meet the **FIRE MISSION CRITERIA** will generate a fire mission.

(2) The **ATI;DPMOD** list is ordered as follows for reduction of printer output:

- **INCOMPATIBILITIES** reports
- **RECOMMENDED FOR INSPECTION** reports
- **RECOMMENDED FOR COMBINATION** reports
- **CONSTITUENTS** reports
- **IN FAN** reports

### 5005. Target File Maintenance

The BCT/LCU will store 2000 targets. To maintain a manageable target file, targets must be deleted as appropriate. The GCE FSCC and TPC are the managers of the target file and are responsible for performing target file maintenance. Although the storage capability of the BCT is extensive, it is possible to degrade system functions by inundating the memory. To preclude overextending the memory capabilities of the system, continuous and thorough file maintenance must be performed. Targets are deleted from the target file using **ATI;TGR** or **ATI;SRCH** formats. The following parameters serve as a guide to determine when targets should be deleted.

- a. Delete targets as directed by the artillery regimental commander or his representative.
- b. Delete the constituents (those targets that made up the solution) after automatic combination if the combination is acceptable.
- c. Review each **RECOMMENDATION FOR COMBINATION** and **RECOMMENDATION FOR INSPECTION** report. When the recommendation is valid and accepted, the targets are manually combined using the **ATI;COMB** format and a new target number is assigned. The constituents are deleted.
- d. Delete all fired targets with a disposition of destroyed.

- e. Delete all other fired targets older than two hours.
- f. Delete all **ARMOR** targets older than one hour during defensive operations.
- g. Delete other target reports periodically as required. Experience must be used to determine when to delete those categories. For planning purposes, targets older than four hours should be deleted.

## **5006. Control of Field Artillery Radars**

### **a. Missions**

Artillery radars may be assigned either in GS or DS of artillery units. Artillery radars function in one of two missions and in one of two modes.

- (1) Radar sections in GS are centrally controlled by the artillery regimental S-3 and support the artillery regiment as a whole.
- (2) Radar sections in DS are attached to or placed under the operational control of an artillery battalion or battery.

### **b. Modes**

Artillery radars operate either in the hostile fire mode or friendly fire mode.

- (1) The hostile fire mode is the principal operating posture for artillery radars. In this mode, radars locate hostile artillery, mortars, and rockets, and predict the point of impact as well as the firing weapon's location.
- (2) The friendly fire mode allows the radar to be used to register friendly fire units. This mode can be manipulated to use the radar for adjustment of fires; *however*, the radar computer software is not designed to process adjustments and these missions must be done using voice communications.

### **c. Radar Zones**

Radars are normally assigned a GS mission and operate in the hostile fire mode under the control of the artillery regimental TPC. The TPC assigns each radar a sector of search using the **SPRT;SEARCH** format. Each sector

of search is approximately half the division frontage in width and extends from four kilometers behind the FLOT to the far end of the division's zone or to the maximum range of the radar. Within this sector the TPC normally assigns (using the **SPRT;FILTER** format) four types of zones. The type of zone determines how the radar handles detections of trajectories originating or terminating within the zone.

**(1) Call for Fire Zone (CFFZ).** The **CFFZ** is established within the sector of search beyond the coordinated fire line (CFL) and extends to the maximum range of the Q-36.

**(2) ATI Zone (ATIZ).** The **ATIZ** is established within the sector of search between the minimum range of the Q-36 and the CFL.

**(3) Critical Friendly Zone (CFZ).** **CFZs** are established around friendly forces or areas that the GCE considers critical to the success of the operation; e.g., division combat operations center, supply areas.

**(4) Censor Zone (CZ).** **CZs** are established around friendly units within the search sector to prevent targeting these units.

## 5007. Counterfire

Counterfire is the attack of the enemy's indirect fire support resources. The location and suppression of these weapons is essential for maneuver elements to have success on the battlefield. A single attack of a counterfire target may not achieve lasting suppression; therefore, multiple sensings of the same target may be received and multiple engagements may be required. Counterfire is not an end in itself, but another form of fire support for the division. Priorities for engaging counterfire targets are based on the criticality of the maneuver situation and the reliability of the source reporting the target. The BCT/LCU does not prioritize fire missions; therefore, the FDC and the TPC must constantly review incoming fire missions and **ATI** reports to attack the highest priority targets first. The execution of counterfire is one of the primary missions of the artillery regiment and controlling the counterfire effort is one of the primary concerns of the artillery regiment staff and the TPC.

**a. Counterfire Posture**

The commander assigns a counterfire posture and guidance for the attack of counterfire targets. The guidance indicates whether counterfire targets are attacked immediately or planned in a program of fires. Additional specific guidance may be provided for different types of counterfire targets.

**b. Counterfire Planning**

Counterfire planning techniques include traditional counterfire planning, on-call counterfire programs, and immediate counterfire.

**(1) Traditional Counterfire Planning.** Traditional planning involves developing target lists, scheduling fire units, and firing the program on a time schedule. A division operations order for a major offensive or defensive operation includes counterfire targets to support the maneuver portion of the operation. Additional targets are developed according to the GCE commander's guidance for the operation. The TPC will cooperate with the artillery FDC in developing the counterfire program. The fire plan will be named in accordance with appendixes B and C except that numerical sequence of the counterfire program begins at 3 (1 and 2 are reserved for on-call counterfire plans).

**(2) On-Call Counterfire Programs.** On-call counterfire programs are prepared and fired in response to an operational situation. The artillery FDC and its subordinate battalions will habitually maintain two permanent counterfire programs. These programs are named counterfire plan 1 (CF1) and counterfire plan 2 (CF2). (See appendixes B and C for naming of fire plans.) AFU and SPRT will always be current for these plans. The TPC, in conjunction with the artillery regimental S-2, is responsible for developing the target lists using the following steps.

**(a) Targeting** for these programs depends on the operational situation. If all counterfire targets are fired immediately, no targeting for the programs will occur. If the tactical situation dictates, or ammunition constraints prohibit engaging counterfire targets as they are developed, targeting will occur for the programs.

(b) Targets will first be selected for plan **CF1**. In the absence of other guidance, the program will include all artillery, mortar, medium and heavy rockets and missiles, and personnel/observation post (OP) target types; both those fired and unfired; that are not more than 2 hours old; and that have a report value (RV) of 100 or less. The TPC is responsible for developing the counterfire target list. The TPC transmits the preliminary target list to the regimental FDC. The regimental FDC schedules the fire plan, coordinates with the appropriate FSCC, and transmits the targets in the schedule of fires (TISF) to the subordinate battalion FDCs.

(c) As soon as the TPC sends the preliminary target list to the regimental FDC, targeting begins for **CF2** using the same criteria as in paragraph 5007b(2)(b) above. Once **CF2** is complete and the TISF sent to the battalions, the regimental FDC deletes **CF1 TISF**, **FPTGT**, and **FPLST**.

(d) The TPC begins retargeting for **CF1**.

(e) In this manner, a current on-call counterfire plan is always available. New plans should be developed and transmitted hourly.

(f) When developing a list of targets for **CF1** and **CF2**, system processing can bog down with excessive **ATI;PREFPs**. The following procedures should be used when developing a list of targets.

- TPC uses the **ATI;SRCH** format to perform a Level 1 search of the TPC's target file. In the absence of other guidance, the criteria established in paragraph 5007b(2)(b) above should be used. If the total number of targets is excessive, further restrict search criteria and search the target file again. Continue restricting criteria until an acceptable number of targets for a list of targets is obtained.
- Using the same search criteria that produced an acceptable number of targets, perform a Level 2 search of the TPC's target file. A Level 2 search yields a one line summary of a target. Analyze this list for duplications and possible deletions.

- After ensuring that the regimental FDC has a fire plan file built and is ready to receive targets, the TPC enters an **ATI;PREFP** format with the same search restrictions as in the preceding step with the regimental FDC logical name in the **TO** field. The results in the preliminary target list being transmitted to the regimental FDC are in the form of **NNFP/XTGTs**.

**(3) Immediate Counterfire.** Firing selected targets in a particular area of the battlefield in response to a maneuver request is immediate counterfire. Requests for immediate counterfire from maneuver elements can be handled in one of two ways. Either **CF1** or **CF2** can be executed (if being used), or targets in one or more of the counterfire reference grids (CRGs) may be fired. If the CRG is used to designate fires, then the artillery S-2s must have accurate and current target maps to check which targets fall in the CRG(s) and provide targets immediately to the FDO. Alternatively, the TPC may search the CRG (by rectangular search) and provide counterfire targets to the regimental FDO for assignment to battalions.

#### **c. Fire Support Coordination of Counterfire Targets**

It is the responsibility of the regimental FDC to perform proper coordination of the counterfire plan with appropriate FSCCs prior to transmitting the plan to the battalion FDCs. To accomplish this coordination, the **TISF** is transmitted to the division FSCC for review. Division FSCC will transmit a **SYS;PTM** indicating approval of the **TISF** and/or any targets not cleared.

### **5008. Fire Missions Generated by the ATI Function**

The division FSCC or the TPC computer may generate fire missions from **ATI MODE 3** operation. In addition, the Q-36 radars may generate missions resulting from **CFFZs** or **CFZs**.

#### **a. TPC Actions**

**(1)** The TPC immediately sends every target received as a **FM;CFF** from the radars to the regimental FDC for engagement.

(2) The TPC will automatically initiate a fire mission when incoming **ATI** reports present a suitable target based on the criteria entered in the **ATI;FMMOD** message. If an incoming **ATI** report from a Q-36 generates a combination report with one or more single targets or a target solution, and *any* of the constituents has been fired, *do not fire* on the solution unless examination of the date-time groups (DTGs) of the reports indicates a new target. If the same incoming **ATI** report generates a combination report with one or more single targets or a target solution, and *none* of the constituents has been fired, *fire* the solution.

#### b. Senior GCE FSCC Actions

The GCE FSCC generates fire missions on HPTs from **ATI MODE 3** processing. Fire missions are transmitted to the FDC only if the target is a HPT (because of the nature of the **ATI;FMMOD** entries, some targets that match the fire mission criteria may not be in compliance with the HPT list) *or* if the attack guidance matrix indicates that the target is to be attacked by artillery. If the target meets neither criteria, pass it to an appropriate agency or use a **NNFP;FPTU** message to place the target in the appropriate plan file for future attack in a fire plan.

#### c. Mission Flow

Figure 5-1 describes the processing of an **ATI MODE 3** generated fire mission.

(1) Both the TPC and the division FSCC create a **FM;CENTER** file for all fire units under the regimental FDCs name. This is a **FMMOD** file requirement.

(2) Both TPC and the division FSCC enter the regimental FDC as the default address in the **COMM, SUBSCRIBER** menu.

(3) A false observer **10** should be used in the observer file. The FSCC or TPC location should be used as the observer location. This is required since the BCS will not generate **FM;FOCMDs** if no observer is specified.

STEP	AGENCY	ACTION
1	Division FSCC or TPC	Receives an ATI report that causes a fire mission to be generated. FM;CFF is printed with a fire mission chain. Since no fire units are available, fire mission is addressed to the default address, the regimental FDC.
2	Division FSCC or TPC	Examines the target. Determine if the target is a HPT and if the target is to be attacked by artillery.
3	Division FSCC	For missions generated at division FSCC that require clearance, readdresses FM;CFF and transmits it to appropriate regimental FSCC for steps 3a through 3c. If clearance is not required, go to step 4.
3a	Regimental FSCC	Automatically solves received FM;CFF and generates a FM;CFF due to FM;CENTER file processing. FM;CFF is readdressed and transmitted to appropriate battalion FSCC.
3b	Battalion FSCC	Clears or denies the mission by transmitting SYS;PTM:____ [target number] CLEARED (or DENIED) to regimental FSCC. Battalion FSCC then uses the FM;COMD message to delete the fire mission.
3c	Regimental FSCC	Retransmits SYS;PTM to division FSCC and then uses the FM;COMD message to delete the fire mission.
4	Division FSCC or TPC	Enters observer 10 in the FM;CFF and transmits the mission to regimental FDC.
5	Regimental FDC	If the mission is from the TPC, coordinates mission as required by requesting clearance from division FSCC. (If clearance is required, the FM;CFF is readdressed and transmitted to division FSCC.) Ensures that OB:10 is entered in the FM;CFF and transmits FM;CFFs to battalion FDC.
6	Battalion FDC	Processes fire mission and transmits to battery FDCs.
7	Battery FDC	Processes mission. Transmits FM;FOCMD SHOT and RDCOMP which are automatically addressed to battalion FDC. At each level the FOCMD is automatically retransmitted until it is received at the division FSCC or TPC that originated the mission.
8	Division FSCC or TPC	Upon receipt of FOCMD RDCOMP, completes and enters FM;SUBS for the target with EOM:YES. This clears the mission from the buffers in all the computers.

Figure 5-1. ATI MODE 3 Fire Mission Processing

## **5009. Dissemination of the Target List**

### **a. Manual Versus Automated Targeting**

Manual targeting is accomplished by nominating targets to each unit's list of targets. At each echelon, the lists of targets are resolved for duplications, then forwarded to the next higher echelon. The GCE FSCC resolves all lists and disseminates those targets accepted as the target list. Automated targeting follows a very similar track. Targets are nominated, starting at the maneuver company's FO, by use of the **ATI;CDR** or **ATI;AZR**. These are retransmitted to the GCE FSCC via **MOI** and **ATI MODE 2** processing. The targets are not recorded at the echelons below the GCE FSCC since the resolution of duplications has not yet occurred. At the GCE FSCC, duplications are resolved automatically by **ATI MODE 3** processing.

### **b. Dissemination of the Target List**

Once target nominations are received by the GCE FSCC, automatic resolution of duplications occurs. The target list is maintained and managed by the GCE FSCC. Dissemination of the target list is accomplished as an ongoing and continuous process. Targets are automatically transmitted by **SRI** processing to the regiment in whose zone the target plots. These targets are further disseminated by **SRI** processing to the battalion FSCC in whose zone the target lies. Each update or deletion action taken at the division FSCC is transmitted to the subordinate FSCC to accomplish file maintenance and to ensure that the same target data is maintained at all levels.

## **Chapter 6**

# **Fire Planning**

### **6001. General**

There are five methods of fire planning used in MCFSS:

- Counterfire planning
- Combined effort fire planning
- Quick fire support planning
- FASCAM fire planning
- MEU Operations Mode fire planning

### **6002. Counterfire Planning**

The artillery regiment or battalion FDC, in conjunction with the TPC, is responsible for developing and scheduling counterfire plans. The fire planning sequence in applicable BCT/LCU technical manuals (TMs) is used with the following exceptions.

#### **a. Coordinating Targets**

Prior to entering a target that violates a restrictive FSCM on to the fire plan preliminary target list (FPLST), the artillery FDC must obtain approval from the GCE FSCC.

#### **b. Obtain Division FSCC Approval**

Prior to transmitting the fire plan to the battalion FDCs, the artillery FDC must send the TISF to the GCE FSCC for approval.

#### **c. Fire Planning Sequence**

Figure 6-1 provides the modified fire planning sequence used to prepare a counterfire plan.

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
1-R	Establish NNFP modification file at the TPC.	NNFP;ATTACK NNFP;CMD NNFP;FUSEL NNFP;MOD NNFP;XCLUDE	NNFP;4221	Alerts the FDC to build the modification file and transmits changes to the FDC.
2-O	Review NNFP modification file.	NNFP;CMD	NNFP;4221	Used to review modification file for fire plan and to ensure changes made in step 1 are reflected.
3-R	Establish related files.	AFU;BUILD SPRT;BUILD	AFU;2203 SPRT;7202	Associates batteries and geometry from current plan with fire plan.
4-O	Review batteries and geometry.	AFU;CMD SPRT;CMD	AFU;2203 SPRT;7201	Omitted unless changes were made to geometry or AFU data in step 3.
5-R	Develop FPLST (fire plan preliminary target list).	ATI;PREFP NNFP;FPTU	NNFP;4211	TPC enters ATI;PREFP message for a count of targets. Search criteria is adjusted until acceptable number of targets is determined. Acceptable search criteria is entered again for level 3 search. FPLST is created and printed. TPC reviews FPLST and adds or deletes targets as required using NNFP;FPTU message.
6-O	Review FPLST.	NNFP;CMD	NNFP;4211	Performed if original FPLST in step 5 was altered.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-1. Counterfire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
7-R	Transmit FPLST to the FDC.	NNFP;CMD		TPC transmits FPLST to FDC. NNFP;4211 FPLST prints at FDC when entire list has been received.
8-R	Develop fire plan (FPTGT) and on-call target list (ONCALL).	NNFP;INST		Must be performed by FDC on all targets. Entries override modification file except MAX VOLS.
9-R	Print FPTGT or ONCALL.	NNFP;CMD	NNFP;4212 NNFP;4213	FPTGT ONCALL
10-C	Reserve fire units (RESFU).	NNFP;RESFU		Only performed if fire units assigned to plan must fire scheduled, higher priority mission during the plan's execution.
11-O	Review fire unit reservations.	NNFP;CMD	NNFP;4227	
12-C	Coordinate FPTGT.	NNFP;CMD SYS;PTM		FDC advises GCE FSCC to build MOD FILE for plan. When FSCC reports ready, FDC transmits FPTGT to GCE FSCC. FDC receives changes/ approval to FPTGT from FSCC in SYS;PTM.
13-R	Compute fire plan solution.	NNFP;COMFP	NNFP;4214 NNFP;4215 NNFP;4216 NNFP;4217 NNFP;4218 NNFP;4219	Regimental FDC computes plan.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-1 (continued). Counterfire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
14-C	Modify computed fire plan.	NNFP;COMD NNFP;INST NNFP;FPA NNFP;COMFP		Use of NNFP;INST or NNFP;FPTU messages require recomputation of fire plan. Delete TISF. Reinstruct. Minor changes. Recompute fire plan.
15-C	Transmit warning order.	SYS;PTM		Transmit to GCE FSCC to warn that TISF will be transmitted.
16-R	Transmit TISF.	NNFP;COMD	NNFP;XTGT NNFP;XSCD	Send to GCE FSCC. FSCC must have fire units built in plan to receive complete TISF.
17-R	Approve/modify fire plan.	NNFP;FPTU NNFP;INST NNFP;FPA SYS;PTM	NNFP;FPTU NNFP;INST NNFP;FPA SYS;PTM	Receive recommended changes to fire plan from GCE FSCC in a PTM. FDC makes changes to plan.
18-R	Notify subordinate battalions.	SYS;PTM		FDC directs subordinate FDCs to build MOD FILE, AFU, and SPRT files for PLAN name from current plan.
19-R	Report ready.	SYS;PTM		Subordinate FDCs report to FDC that they are ready to receive the fire plan.
20-R	Transmit TISF.	NNFP;COMD	NNFP;XSCD NNFP;XTGT	Transmit to subordinate FDCs; TISF prints when received complete.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-1 (continued). Counterfire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
21-R	Transmit fire plan to battery FDCs.	NNFP;EXECFP	NNFP;CFF	Battalion FDC transmits NNFP;CFFs to battery FDCs.
22-R	Execute fire plan.	SYS;PTM		GCE FSCC sends order to execute fire plan to FDC.
23-R	Regimental FDC passes H-hour.	SYS;PTM		Transmits to battalion FDCs.
24-R	Battalion FDC passes H-hour.	SYS;PTM		Transmits to subordinate batteries.
25-R	Battery FDC fires plan.	BCS;COMD	FM;CFF	Battery FDC enters H-hour and executes. Fire plan targets are processed as computer generated time on target (TOT) missions.
26-R	Transmit ammo update to battalion FDC.	AFU;AMMO:E;		Batteries transmit to battalion FDCs.
27-R	Purge plan.	NNFP;COMD		Senior FDC purges plan and transmits NNFP;COMD:PURGE to all other stations.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-1 (continued). Counterfire Planning Sequence

### **6003. Combined Effort Fire Planning**

The FSCC requesting the plan is responsible for the targeting and scheduling of the fire plan. The FDC that will execute the plan assigns fire units and computes the plan. The completed plan is submitted to the FSCC for approval.

#### **a. Current Operations**

A current plan is a plan that will be executed in the near future. No great change is expected in the current FSCMs (support geometry) and artillery fire unit (AFU) data from the time the plan is built until it is executed. During current operations, the AFU and SPRT files for the plan are copied from the current plan.

#### **b. Future Operations**

If a significant time lapse is expected between building and executing the plan, the plan is termed a future plan. If the plan is a future fire plan, the FSCC is responsible for the SPRT files and the FDC is responsible for the AFU files.

(1) The FSCC enters any future geometry and transmits this to the FDC. The FDC enters the geometry received.

(2) The FDC starts with the current AFU data for all fire units. When the plan targets are received, the FDC determines which fire units must be moved to support the plan. The fire plan is then computed at the FDC and transmitted to the FSCC for final approval.

#### **c. Fire Planning Sequence**

Figure 6-2 provides the modified fire planning sequence used to prepare a combined effort fire plan.

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
1-R	FSCC warns FDC to build modification file for future or current FP.	SYS;PTM		FSCC indicates plan name and if plan is a current or future plan.
2-R	FSCC and FDC establish NNFP;MOD file.	NNFP;COMD	NNFP;4211	Both stations build modification file for <b>PLAN</b> name from current plan.
3-O	FSCC modifies NNFP;MOD file.	NNFP;MOD NNFP;ATTACK NNFP;FUSEL NNFP;XCLUDE		FSCC enters, and transmits to the FDC, desired changes to NNFP;MOD file.
4-O	Review NNFP;MOD file.	NNFP;COMD	NNFP;4221	Executed if NNFP;MOD was changed in step 3.
5-R	Report ready.	SYS;PTM		FDC reports modification file is complete to FSCC.
6a-C	If plan is <i>current</i> plan, add support files to fire plan from current data.	SPRT;BUIL	SPRT;7202	Both FDC and FSCC build support files at their computers.
6b-C	If plan is <i>future</i> plan, add support files to fire plan.	SPRT;BGEOM SPRT;ZNE SPRT;COMD	SPRT;7201	FSCC inputs future geometry into plan at its LCU and transmits to FDC.
7a-C	If fire plan is a <i>current</i> plan, add fire unit files to fire plan from current data.	AFU;BUILD	AFU;2203	Both FDC and FSCC build AFU files at their computers.
7b-C	If fire plan is a <i>future</i> fire plan, add fire unit files to fire plan.	AFU;UPDATE AFU;AMMO AFU;COMD		FDC inputs future fire unit location into plan at its BCT and transmits to FSCC.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-2. Combined Effort Fire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
8-O	Review fire unit/ geometry files.	AFU;COMD SPRT;COMD	AFU;2203 SPRT;7201	
9-R	FSCC develops FPLST.	ATI;PREFP NNFP;FPTU	NNFP;4211	
10-O	Alter FPLST.	ATI;PREFP NNFP;FPTU NNFP;COMD		Major additions. Minor add/delete. Delete FPLST.
11-R	Transmit guidance to FDC.	SYS;PTM		FSCC transmits length of plan, length of phases, H-hour time or on-call and any coordinating instructions to FDC.
12-R	FSCC develops FPTGT and ONCALL.	NNFP;INST		Must be performed on all targets FSCC wants to schedule. Entries override modification file except MAX VOLS. Enter time relative to H-hour or phase. May make desired groups and series; enter munitions, volleys/effects.
13-R	Print FPTGT or ONCALL.	NNFP;COMD	NNFP;4212 NNFP;4213	FPTGT ONCALL
14-R	FSCC transmits FPTGT to FDC.	NNFP;COMD	NNFP;4212	Transmits each target as NNFP;XTGT and XSCD. Final target XTGT is transmitted twice, cueing receiving BCT that entire list has been received. Receiving BCT automatically prints FPTGT.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-2 (continued). Combined Effort Fire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
15-C	FDC reserves fire units.	NNFP;RESFU		This step performed only if fire units assigned to plan must perform higher priority mission during execution of plan.
16-O	Review fire unit reservations.	NNFP;COMD	NNFP;4227	
17-R	Compute fire plan solution.	NNFP;COMFP	NNFP;4214 NNFP;4217 NNFP;4218 NNFP;4219	FDC computes plan. Use of NNFP;INST or NNFP;FPTU messages after this step requires recomputation of fire plan. If H-hour is known, it is entered in message.
18-C	Modify computed fire plan.	NNFP;COMD NNFP;INST NNFP;FPA NNFP;COMFP		Delete TISF. Reinstruct. Minor changes. Recompute fire plan.
19-R	FDC transmits TISF.	NNFP;COMD	NNFP;XTGT NNFP;XSCD	Send to FSCC for approval.
20-R	Approve/modify fire plan.	NNFP;FPTU FIREPLAN NNFP;INST NNFP;FPA SYS;PTM	NNFP;FPTU NNFP;INST NNFP;FPA SYS;PTM	Receive changes to fire plan from FSCC or PTM from FSCC approving fire plan.
21-R	Notify subordinate battalion FDCs.	SYS;PTM		Instruct to build AFU and SPRT files for PLAN name.
22-R	Report ready.	SYS;PTM		Subordinate battalions report that they are ready to receive fire plan.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-2 (continued). Combined Effort Fire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
23-R	Transmit targets in TISF.	NNFP;COMD	NNFP;XSCD NNFP;XTGT	Transmit to subordinate battalions.  <b>NOTE:</b> Future fire unit locations and <b>SPRT</b> geometry need not be transmitted to battalion FDCs. Receiving computers do not need this information as computed <b>TISF</b> is complete and will not be recomputed.
24-R	Transmit fire plan to battery FDCs.	NNFP;EXECFP	NNFP;CFF	Transmit to subordinate batteries.
25-R	Fire the fire plan.			This step depends on how the plan was built. If H-hour was entered as plan was computed or executed, plan fires automatically. If fire plan was on-call, responsible FSCC transmits <b>SYS;PTM</b> with H-hour.
26-R	Transmit ammo update to battalion FDC.	AFU;AMMO		Batteries transmit to battalion FDCs.
27-R	Transmit ammo update to regimental FDC.	AFU;AMMO		Battalion FDCs transmit to regimental FDC.
28-R	Purge plan.	NNFP;COMD		As directed by the responsible FSCC.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-2 (continued). Combined Effort Fire Planning Sequence

### **6004. Quick Fire Support Planning**

Quick Fire Support Planning is used when there is little time to prepare a formal plan. These are done in one phase applying the following procedure.

- a. A maneuver battalion commander desires a quick fire support plan. He requests permission of the regimental commander to plan the fires of his supporting artillery battalion.
- b. The request is approved by the regimental commander, and the artillery battalion S-3 is notified.
- c. A **SYS;PTM** is transmitted from the battalion FDC to the requesting battalion FSCC indicating the time span and units to be used for the hasty fire support plan.
- d. The requesting FSCC sends **SYS;PTM** to FDC telling them to build files for plan name; e.g., **QK31A6**.
- e. FDC builds desired fire units into plan name using **AFU;BUILD** format.
- f. FDC uses **SYS;PTM** to send ready to FSCC; e.g., **READY QK31A6**.
- g. FSCC computes fire plan using **NNFP;COMFP** format with the following entries:  
  
    **PLAN:\_\_\_\_\_**; [plan name]  
    **HHOUR:00/00**; [or specified time if not on call]  
    **COMPUTE FIRE PLAN FOR:**  
        **FIRE PLAN + ON CALL + TGTS LEFT IN THE PRELIMINARY TARGET LIST**  
    **PHASE1:0/##**; [For length, always start with the number of targets plus one. NOTE: May not exceed 60 minutes per phase, or 120 minutes per plan.]
- h. FSCC reads and reviews the **FPSUM**.
- i. FSCC transmits **TISF** with H-hour to the battalion FDC.
- j. Battalion FDC uses the **NNFP;EXECFP** format to transmit the fire plan to the battery FDCs, where it is executed.

### 6005. FASCAM Fire Planning

FASCAM fire planning is a cooperative effort between the requesting FSCC and the battalion or regimental FDC. The requesting FSCC obtains approval to fire FASCAM from the GCE FSCC and coordinates any violations of FSCMs with the establishing agency. The FDC schedules the fires and reports ready to the FSCC. The FSCC orders the execution of the fire plan. Figure 6-3 provides the modified fire planning sequence necessary to prepare a FASCAM fire plan.

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
1-R	Obtain GCE FSCC approval.	SYS;PTM		FSCC obtains approval/ denial from GCE FSCC.
2-R	Requesting FSCC sends warning order to FDC.	SYS;PTM		Directs FDC to establish files for <b>PLAN</b> name.
3-R	Establish NNFP;MOD file.	NNFP;COMD NNFP;MOD NNFP;XCLUDE NNFP;FUSEL		If modifications not made, BCT/LCU uses <b>CURRENT</b> plan modification file.
4-O	Review the NNFP;MOD file.	NNFP;COMD	NNFP;4221	Update entries as required using messages in Step 3.
5-R	Establish related files.	AFU;BUILD SPRT;BUILD	AFU;2203 SPRT;7202	Associates batteries and geometry with fire plan.
6-O	Review batteries and geometry.	AFU;COMD SPRT;COMD	AFU;2203 SPRT;7201	
7-R	Transmit ready.	SYS;PTM		FDC reports ready to receive target.
8-R	FSCC transmits target to FDC. FDC computes fire plan solution.	NNFP;FASCAM	NNFP;4214 NNFP;4217 NNFP;4219 NNFP;4228 SPRT;BGEOM	FDC enters NNFP;FASCAM. Use of NNFP;INST after this step requires recomputation of fire plan.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-3. FASCAM Fire Planning Sequence

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
9-R	Transmit planned safety zone.	SPRT;BGEOM		SPRT;BGEOM is automatically stored at FDC.
10-O	Modify computed fire plan.	NNFP;INST  NFP;FASCAM	NNFP;4214 NNFP;4217 NNFP;4219 NNFP;4228  SPRT;BGEOM	Used to replace fire units for specified target(s). Make changes to minefield parameters or include changes made by NNFP;INST. Also recomputes fire plan. Transmit new safety zone.
11-C	Transmit minefield targets.	NNFP;COMD	NNFP;XTGT NNFP;XSCD	Regimental FDC transmits targets to battalion FDCs and requesting FSCC.
12-R	Execute fire plan.	NNFP;EXECFP (Do not input H-HOUR or PHASE)	NNFP;4229	FSCC sends to FDC. FDCs review NNFP;4229 and compare with NNFP;4228.
13-R	Transmit fire commands to batteries.	NNFP;CFF		SPRT;BGEOM:LFSZ is cued for transmission to FSCC.
14-R	Transmit LFSZ.	SPRT;BGEOM	SPRT;BGEOM	LFSZ is stored by FSCC. It should be printed and manually plotted.
15-R	Transmit ammo update to battalion.	AFU;AMMO		Batteries transmit to battalion.
16-R	Transmit ammo update to regiment.	AFU;AMMO		Battalions transmit to regiment.
17-R	Purge plan.	NNFP;COMD		At the direction of requesting FSCC.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-3 (continued). FASCAM Fire Planning Sequence

### 6006. MEU Operations Mode Fire Planning

Because of the limited capability of the BCS to fire plan, this type of fire planning is accomplished at the battalion FSCC using the procedure set forth in figure 6-4.

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
1-R	Establish NNFP;MOD file.	NNFP;MOD		FSCC builds modification file for the PLAN name.
2-O	Review NNFP;MOD file.	NNFP;COMD	NNFP;4221	
3-C	If FP is for future operation, enter SPRT files for future locations.	SPRT;BUILD		FSCC does not transmit these to battery FDC since BCS cannot store them.
4-C	For future plan, FSCC approves battery locations.	SYS;PTM  AFU;UPDATE with plan name		FDC transmits SYS;PTM with future locations.  FSCC transmits SYS;PTM approving or recommending changes.
5-O	Review fire units and geometry.	AFU;COMD SPRT;COMD	AFU;2203 SPRT;7201	
6-R	Develop FPLST.	NNFP;COMD	NNFP;XTGT	
7-O	Review FPLST.	NNFP;COMD	NNFP;4211	
8-O	Alter FPLST.	ATI;PREFP NNFP;FPTU NNFP;COMD		Major additions. Minor add/delete. Delete FPLST.
9-R	Develop FPTGT and ONCALL.	NNFP;INST		Perform on all targets; entries override NNFP; MOD except MAX VOLS.
10-O	Print FPTGT or ONCALL.	NNFP;COMD	NNFP;4212 NNFP;4213	FPTGT ONCALL

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

**Figure 6-4. MEU Operations Mode Fire Planning Sequence**

STEP	ACTION	RELATED MESSAGES	OUTPUT REPORT/ MESSAGE	REMARKS
11-C	Reserve fire units.	NNFP;RESFU		
12-O	Review fire unit reservations.	NNFP;COMD	NNFP;4227	
13-R	Compute fire plan solution.	NNFP;COMFP	NNFP;4214 NNFP;4217 NNFP;4218 NNFP;4219	Use of NNFP;INST or NNFP;FPTU messages after this step requires recomputation of fire plan.
14-C	Modify computed fire plan.	NNFP;COMD NNFP;INST NNFP;FPA NNFP;COMFP		Delete TISF. Reinstruct. Minor changes. Recompute fire plan.
15-R	Transmit fire commands to battery FDC.	NNFP;CFF		Transmit to battery with H-hour. If on-call, transmit command to fire as TOT later. (BCT/LCU transmits H:0/0; to BCS; BCS interprets H-hour as midnight; FSCC must notify FDC.)  <b>NOTE:</b> BCS stores only 10 targets per plan. If more are transmitted, BCS operator changes name of plan beginning with 11th target and stores additional targets as second plan.
16-R	Transmit ammo update to battalion FSCC.	AFU;AMMO		Battery transmits to battalion FSCC.
17-R	Purge plan.	NNFP;COMD		At direction of FSCC.

Step Legend: R=Required Step; C=Conditional Step; O=Optional Step

Figure 6-4 (continued). MEU Operations Mode Fire Planning Sequence

## 6007. MCFSS Fire Planning Hints

Fire planning with MCFSS consists of a standard sequence of procedures. These procedures should be done in order in accordance with the appropriate fire planning sequence outlined in this chapter.

### a. Notes on Modification File Entry Messages

(1) Associate a zone established in the **SPRT** geometry file with each plan. The computer generates a warning every time a target in the fire plan is not located in that zone.

(2) If the **AFU;BUILD** message is used, the current **CSR (AFU;ASR)** will be built into the new plan including all current expenditures. To reset the expenditure counter to zero, enter the **AFU;ASR** message with **PLAN**, **WPN** or **FU** specified, and **ZERO** entered in the **EXPEND** field. This will zero the counter and retain the current **CSR (ASR)** level in the new plan. If a separate **CSR (ASR)** level is desired, it must be entered using a separate **AFU;ASR** input message.

### b. NNFP;INST Input Message

Specific scheduling instructions for **FPLST** targets concerning **PRIORITY** and **PHASE** are specified using this message. Entries on this message can **OVERRIDE** all modification file criteria except fire unit exclusions and **MAXVOLS**.

(1) Normally, make no entry in **UFFE**, **EFF**, or **ANGLE** field when initially inputting a target. These mnemonics are most often used to resolve target exceptions and provide specific instructions for a specific fire unit.

(2) At a minimum, specify **PRIOR:4** (higher priorities may be used if desired) to prevent the **E&W "NO PRIORITY ENTERED - DEFAULT PRIORITY 4 USED"** from appearing for each target.

(3) For scheduled plans, a target that is to be fired in more than one phase must be reentered using a **NNFP;FPTU** format. This gives the target a new number from the **BCT** target block, effectively disguising it as a new target. This target is not recorded in the target file. Failure to follow these procedures will cause the **BCS** to overwrite the first target data when the repeat target is received with the same target number.

**c. Changes in Fire Unit Status and Support Geometry**

- (1) Fire unit displacements and closings are received directly from the unit or via MOI. The AFU file for a plan must be updated to reflect changes in fire unit ready status, locations, azimuth of lay, etc.
- (2) Geometry changes (e.g., FLOT, CFL) must be updated prior to computing the current plan to incorporate those changes. Changes made in the current plan are not automatically made in the fire plan.

**d. Fire Plan Output Reports**

- (1) **NNFP;4218 Targets in the Schedule of Fires (TISF) Report.** The TISF report summarizes associated data for all targets in the fire plan. The scheduled targets are listed first, followed by on-call targets. The data provided for each target includes the location and description, zone in which the target is located, mission fired status (if previously engaged), any geometry, event time (e.g., based on H-hour), target priorities, phase data, desired and achieved effects or volleys, firing units assigned to the target, and shell and fuze to be used by each fire unit.
- (2) **NNFP;4219 Fire Plan Summary Report (FPSUM).** The FPSUM identifies the warnings and exceptions generated during the computation of the plan. It also provides a summary identifying the total number of targets in the fire plan, the number of scheduled and unscheduled targets, and the total number of targets with warnings. Each target is listed, along with any warning and/or exception that is applicable.
- (3) **NNFP;4217 Fire Plan Ammunition Report (FPAMMO).** The FPAMMO summarizes the ammunition required to execute the fire plan. The report lists ammunition required by shell and fuze for each fire unit.
- (4) **NNFP;4214 Schedule of Fires Report (SCDFIRE).** The SCDFIRE provides scheduling results for each target and provides the status of each unit in the fire plan for the duration of the plan. A legend is provided at the beginning of the report which the fire planner can review.

#### **e. Procedure for Reviewing the Fire Plan Output Report**

(1) Review the **NNFP;4219 (FPSUM)** to determine which targets, if any, are listed as exceptions, and determine which targets, if any, have generated a warning. The targets listed as **EXCEPTIONS** must be resolved before they will be scheduled in the plan. **WARNINGS** on scheduled targets should be cleared through the coordinating **FSCC** (if not already done). Annotate the **FPSUM**, or record the target numbers for targets listed as capability or ammunition exceptions.

(2) Review the **NNFP;4218 (TISF)**. Note target exceptions. The **FPSUM** lists targets that are exceptions. The **TISF** lists the reason the target is an exception. **NOTE:** Before applying any new instruction, use the **NNFP;COMD** message to delete the **TISF**.

#### **f. Reasons for Exceptions**

The reason a target is listed as an exception can be misleading. A target that is an exception for more than one reason is assigned only one exception at a time in the following order: ammunition, capability, scheduling. For example, if a target is both a capability and scheduling exception it will be listed only as a capability exception on the initial computation. If removed, the recomputation will then list the target as a scheduling exception which would also have to be resolved in order to include that target in the plan. Also, a target for repeat fires is scheduled only once in a phase. It can be scheduled in all phases or in any combination of phases. If a target specified for repeat fires cannot be scheduled in any one of the requested phases, the target is noted as an exception and shall not be scheduled in any phase.

#### **g. Solutions to Exceptions**

Implement solutions listed in figure 6-5 and recompute the fire plan. It may take several attempts to develop an acceptable **TISF**.

TYPE EXCEPTION	POSSIBLE CAUSE	SOLUTION
AMMUNITION EXCEPTION	Insufficient ammunition to achieve required volleys or effects.	Verify ammunition. Decrease volleys or effects.
	None of specified type ammunition in file.	Verify ammunition type. Select another ammunition type.
CAPABILITIES EXCEPTION	Not enough fire units available to defeat target.	Assign more FUs or decrease required VOL, EFF, or ECOF.
	Out of range.	Move FU or delete target
	Specified FU or WPN excluded.	Check modification files. Delete exclusions.
	Specified VOL exceeds MAXVOL.	Increase MAXVOL or lower required VOL.
	Illegal SH/FZ combination.	Verify legal entries.
SCHEDULING EXCEPTION	Insufficient time available.	Delete targets with exceptions. Increase phase length. Reschedule to another FU in another phase. Lower VOL or EFF.
NOTE: Any recommended solution that suggests changing commander's criteria must be approved by the FSCC requesting the plan.		

Figure 6-5. Exception Solution Matrix

**h. Eliminating Idle Time**

(1) Idle time must be eliminated between phases by adding additional targets or by deleting that time.

(2) The SCDFIRE lists event times (e.g., based on H-hour). Recompute plans to remove idle time.

(3) The NNFP;FPA may be used during this step to modify or delete targets in TISF status. If the FPA is used do not recompute the plan. (FPAs are discarded when the plan is recomputed.)

#### **i. Scheduling Groups and Series**

(1) **Scheduling Exceptions.** The reason targets are listed as an exception may be misleading, because if any target in a **GROUP** (or **SERIES**) is an exception for any reason (e.g., capability, ammunition, or scheduling) the entire **GROUP** (or **SERIES**) is listed as a scheduling exception. Normally, targets are exceptions for one or any combination of the reasons listed below:

(a) Insufficient fire units available to engage all targets in the **GROUP**.

(b) One or more targets is out of range for all fire units, or not enough available fire units are within range to achieve the desired effects or volleys. (For targets out of range, no fire unit scheduling data will be shown on the TISF. Delete those targets from the plan.)

(c) Insufficient phase length specified on the NNFP;COMFP. (Increase phase length. This reason may also be a combination of the preceding two above; therefore, multiple reinstructs may be necessary to resolve all exceptions.)

(2) **Reviewing the NNFP;4219 (FPSUM).** Review the FPSUM to determine which targets, if any, are listed as scheduling exceptions.

### **6008. Scheduling a Target More Than Once in a Fire Plan**

#### **a. Problem**

Use caution when scheduling a target in more than one phase. If the same battery is scheduled to fire the target, the BCS will overwrite the first NNFP;CFF when it receives the second NNFP;CFF. The third NNFP;CFF will overwrite the second and the fourth will overwrite the third. Thus, if the same battery is scheduled to fire a target in each of the four phases, the BCS will only fire it in the fourth phase.

**b. Solution**

The work-around to this problem is to assign a target location different target numbers for each time that the location is scheduled in the fire plan. Using this method, the number of times a target can be scheduled is increased to 99.

**(reverse blank)**

## **Chapter 7**

# **Battlefield Geometry**

### **7001. General Rules**

- a.** The FSCC that establishes the geometry is responsible for that measure. Two exceptions to this rule are that dead space areas are the responsibility of the establishing FDC, and that planned FASCAM safety zones (PFSZs) and LFSZs become the responsibility of the FSCC that requested the FASCAM mission.
- b.** All geometry is named in accordance with appendix A.
- c.** The third character of each six digit name is a sequential number assigned to the measure. Updates or deletions of points can be applied to established geometry. New geometry will be named using the next higher number.
- d.** All linear measures that divide friendly and enemy sides of the battlefield must be entered with the points establishing the line numbered in ascending order beginning on the left of the friendly side.
- e.** All area measures are entered with the left-rear point first (from a reference facing the enemy). The remaining points are numbered sequentially in a clockwise manner. The first point is not reentered as the last point.
- f.** When new geometry is entered to replace an existing measure, the responsible FSCC enters a SPRT;COMD message to delete the existing geometry.
- g.** Measures requiring an entry for the responsible fire support coordinator (FSCoord) field use a three character TAG as detailed in appendix B.

## 7002. Permissive Measures

### a. Coordinated Fire Line (CFL)

Up to five CFLs per plan may be stored in the BCT/LCU for a total of 24. The management of CFLs may be accomplished in a number of ways, two of which include —

(1) The GCE FSCC may establish a single CFL with each subordinate maneuver unit assigned a number of points. When an update is required, the subordinate unit types the updated points into the SPRT;BGEOM and transmits the message to the appropriate FSCC without entering it. That FSCC either approves the new measure by entering and transmitting the updated measure to subordinate units, or disapproves the update by sending a SYS;PTM to the requesting unit.

(2) Each subordinate unit may establish its own CFL and update the measure as required. Not more than five CFLs can be stored per plan. If more than five units establish CFLs, each unit will store their own CFL and those of the adjacent units. Other received CFLs are plotted and discarded.

### b. Fire Support Coordination Line (FSCL)

Only one FSCL per plan may be stored at the BCT/LCU. The GCE FSCC establishes and updates the FSCL.

### c. Free Fire Area

MCFSS does not recognize free fire areas. When it is necessary to enter a free fire area, the agency establishing it will use the RFA format and name it FF vice RF in accordance with appendix A.

## 7003. Restrictive Measures

### a. Restricted Fire Line (RFL)

Any FSCC possessing subordinate converging units may establish an RFL. Two RFLs per plan may be stored for a total of 24. The BCT/LCU warns any time a trajectory crosses the RFL. Though there is no friendly and enemy side of an RFL, its points are numbered in ascending order from left to right when facing the enemy from the perspective of the stationary force.

If both forces are moving, then the points are numbered from the perspective of the larger force.

**b. Restricted Fire Area (RFA)**

**RFAs** may be established as circular areas defined as a center and radius, or as an area defined by grids. The restricted ammunition may only be entered by type; e.g., **HE**, **CHEM**, etc. Ammunition entries are informational only. The computer warns any time a trajectory terminates in the **RFA** despite the ammunition fired.

**c. No Fire Area**

MCFSS does not recognize no fire areas. When it is necessary to enter a no fire area, the agency establishing it will use the **RFA** format and name it **NF** vice **RF** in accordance with appendix A.

**d. Airspace Coordination Area (ACA)**

**ACAs** are defined in MCFSS by two end points, a width, and a minimum and maximum altitude. All altitudes used will be converted to feet above mean sea level (MSL). The BCT/LCU cannot compute a technical solution for targets fired. This causes the computer to warn that an **ACA** *may* be violated if the trajectory crosses the box as plotted on the ground. The battery FDC must determine if actual trajectories pass through the **ACA**. This is accomplished at the BCS by the following steps:

- (1) Plot the **ACA**.
- (2) Determine the grid to the near corner of the **ACA**.
- (3) Determine firing data to that corner using the minimum altitude of the **ACA**. The quadrant elevation (**QE**) determined is the minimum **QE** for the **ACA**. If that point is also the **ACA** point furthest left or right from the battery's perspective, the deflection determined is one of the lateral limits of the **ACA**.
- (4) Determine the grid to the far corner of the **ACA**.

(5) Determine firing data to that corner using the maximum altitude of the **ACA**. The **QE** determined is the maximum **QE** for the **ACA**. If that point is also the **ACA** point furthest left or right from the battery's perspective, the deflection determined is one of the lateral limits of the **ACA**.

(6) The near and far **ACA** points may not also represent the left- and right-most points of the **ACA** from the battery's perspective. In this case, firing data must *also* be determined to the deflection limit(s) not represented by either the near or far **ACA** points as shown in figure 7-1.

(7) When a trajectory crosses the plotted **ACA**, the deflection and **QE** must be outside the limits established or a different charge/trajectory must be selected.

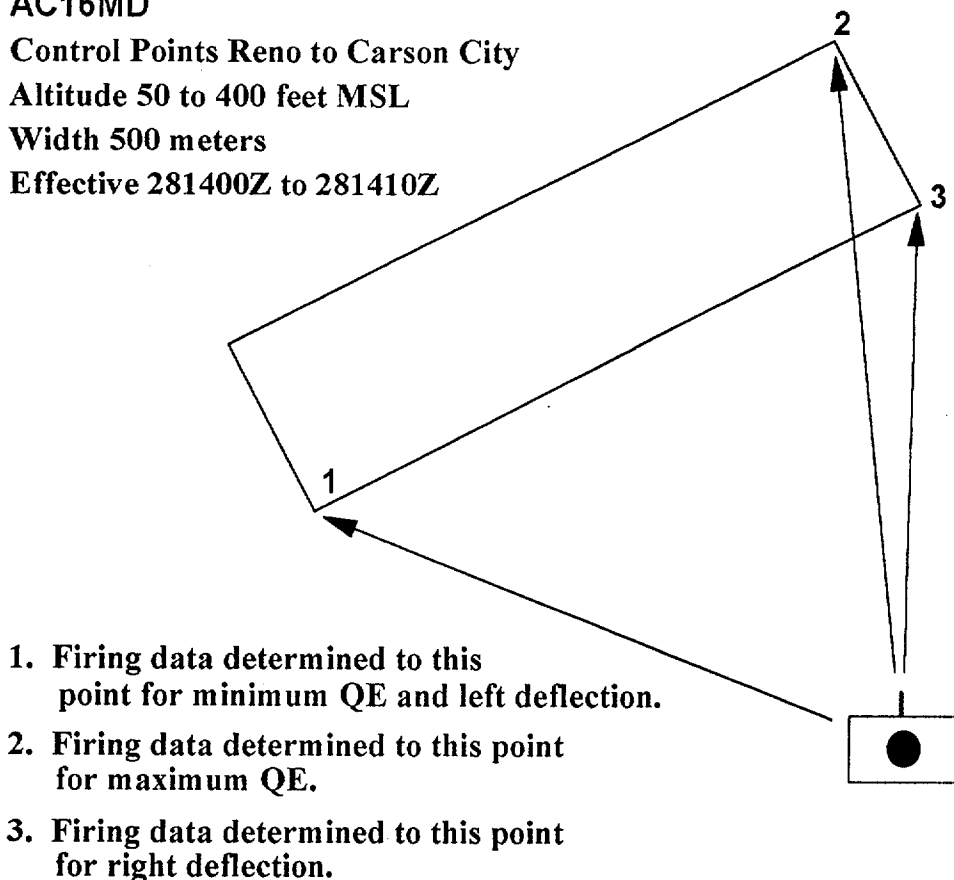
#### **AC16MD**

**Control Points Reno to Carson City**

**Altitude 50 to 400 feet MSL**

**Width 500 meters**

**Effective 281400Z to 281410Z**



**Figure 7-1. Selecting ACA Points for Determination of Firing Data**

## **7004. Other Control Measures**

### **a. Forward Line of Own Troops (FLOT)**

**FLOT** messages transmitted by the DMS are received by the BCT/LCU in the alert queue. The computer operator must enter the plan name and the **FSCORD** fields to process the message.

**(1) Precautions.** The FSCC must guard against the following erroneous entries.

- (a)** Each FO can enter two points in the DMS **FLOT** message. The points must be given unique numbers increasing from left to right to properly orient the friendly side and prevent one reported point from over-writing another.
- (b)** Established **FLOTs** can be updated. However, if an observer or FSCC updates fewer points than were originally established, the points that were not updated remain in their original location.
- (c)** If point numbers are assigned to individual FOs, and the FO's supported unit changes position in the linear arrangement of the friendly frontage, the **FLOT** point numbers must be redistributed by the battalion FSCC.

**(2) Methods For Controlling the FLOT Points.** One of three methods may be used to define the **FLOT**. Each requires practice, and none are absolutely foolproof.

- (a)** Assign **FLOT** points to each FO. The observer reports and updates his point number to the battalion FSCC. The battalion FSCC assigns the **FLOT** name and monitors the **FLOT**.
- (b)** Have the observers report their **FLOT** points to the battalion FSCC. The battalion FSCC plots the points and numbers them. The received **FLOT** messages are then edited at the FSCC computer to assign the name and correct point number.

(c) In fluid situations, the battalion FSCC may rely on the flow of updated observer location messages passed from the FOs' DCTs to track the **FLOT**. Using this technique, the FSCC composes the **SPRT;BGEOM** message.

**(3) Echelon at Which the FLOT is Established.** The **FLOT** may be established down to the maneuver battalion level. However, the fact that the BCT/LCU stores only five **FLOTs** per plan must be considered. A more practical procedure is to establish the **FLOT** at the regimental level with each battalion allocated **FLOT** point assignments. In this method, each battalion enters the **FLOT** message using the regimental **FLOT** name and transmits only *its* points. The messages transmitted by the battalions automatically combine when received at the regimental FSCC to form a complete regimental **FLOT**. The complete **FLOT** is then transmitted to the battalion FSCCs.

**b. Zone (ZONE)**

Each maneuver unit down to the battalion level establishes and updates its zone of operations by entering sufficient grids to define its boundaries. The first point cannot also be the last because the computer connects the points to create a closed area.

**c. Dead Space Area (DSA)**

**DSAs** are those areas completely masked from a unit's indirect fires. The battery FDC reports **DSA** by **SYS;PTM** and grids. These are entered and disseminated from the battalion FDC. The battery FDC uses the following procedures to determine **DSAs**:

- (1) Determine possible **DSAs** behind prominent terrain by map inspection.
- (2) Compute the low angle **QE** with the lowest usable charge and the high angle **QE** with the highest usable charge along the top of the masking terrain feature. This is the near limit of the **DSA**.
- (3) Add range and plot the actual ground altitude at that range. Compute a **QE** to this point.
- (4) Repeat this process until a **QE** equal to that determined at the near limit of the **DSA** is achieved. This location is the far limit of the **DSA**.

(5) Repeat these steps along other azimuths until sufficient points are determined to define the DSA.

**d. Fascam Safety Zones (LFSZ and PFSZ)**

FASCAM safety zones are determined by the computer any time FASCAM is planned or fired. These are sent to the coordinating agency by the agency computing the data, then are further disseminated to all units. These safety zones are deleted at the direction of the coordinating FSCC after the self-destruct time has passed.

**e. Phase Lines**

The BCT/LCU does not provide for the input or use of phase lines as aids to movement control. Phase lines are entered in the CFL format with the phase line named PL vice CL in accordance with appendix A.

**7005. Limitations of the BCS**

Dissemination of boundaries and FSCMs to the battery FDC is limited by the geometry that a BCS can store; i.e., 1 ZONE, 1 FLOT, and 8 circular RFAs. All other SPRT;BGEOM messages can be received, but those types of measures are not recognized by the BCS. The SPRT;BGEOM [1] is left blank. This causes the battery FDC to rely on the name of the geometry to determine what it is. The following specific actions are taken by the BCS.

- a. ZONEs are plotted on the situation map. The ZONE of the supported infantry regiment is stored.
- b. FLOTs are plotted on the situation map. The FLOT of the supported infantry regiment is stored.
- c. RFAs are plotted and stored if circular.
- d. DSAs cannot be reported by the battery FDC since an entry of DSA in SPRT;BGEOM [1] is recognized as an erroneous entry at the BCS. DSAs may be reported for entry at the battalion FDC using SYS;PTM. The DSA may be identified as a series of grids, or a center grid and radius.
- e. All other SPRT data received is printed and plotted on the situation map.

## **7006. Map Modification**

- a.** The BCT, LCU, and BCS use map modification data to perform zone-to-zone transformations; to allow fixed format devices to transmit short coordinates; and, in limited cases, to perform datum conversions.
  
- b.** All stations will maintain the same map modification data to ensure that coordinates are handled in the same manner at all levels. The GCE FSCC will enter and manually transmit the map modification data and any changes to it to subordinate stations. Each lower echelon will transmit the map modification data to its subordinates.

## **Chapter 8**

# **Operations of the Forward Echelon**

### **8001. General**

As with all automated operations, the operations of a forward echelon and assumption of control from the main echelon requires adherence to detailed procedures. Principal concerns include —

- Easy transition without loss of communications to subscribers.
- Transfer of all required files to update the forward echelon.
- Avoidance of two stations using the same address and logical name.
- Transfer of existing fire missions from the main echelon to the forward echelon.

### **8002. Methods**

Two methods of operating forward echelons are available, each with its own advantages and disadvantages.

#### **a. Changing the Name of the Forward Echelon**

Changing the name of the forward echelon to that of the main echelon upon assumption of control is the preferred method. Using this method, the forward echelon occupies the new position and conducts communications checks using the address and logical name of the forward echelon. After updating files at the forward echelon, the forward and main echelons switch identities by altering communications data. All subscribers continue to communicate with the main echelon FDC.

**(1) Advantages.** This technique's principal advantage is in maintaining the flow of information. Subscribers of the main echelon need not be aware of the change of control. Additionally, the vital flow of information via MOI processing is not disrupted since the forward echelon assumes the identity of the main echelon.

**(2) Disadvantages.** In version 10 of MCFSS software, the BCT/LCU does not check for matching SIDs. If this is changed in future software, the SID codes may require changes to avoid illegal acknowledgement authenticator warnings.

#### **b. Operating Under the Forward Echelon Name**

An alternate method is to maintain the logical name and address of the forward echelon after it has assumed control. In this method, all subscribers are notified that the forward echelon is in control and all transactions are conducted with that station.

**(1) Advantages.** This method provides easier communications.

**(2) Disadvantages.** This method requires that each subscriber knows that the change of control has occurred and submits his messages accordingly. Assumption of control of fire missions at the forward echelon is more difficult. MOI files at subscribing stations must be reentered to direct information from the main to the forward station.

### **8003. Changing Names upon Assumption of Control**

This paragraph divides this technique into two procedures. The difference between the procedures deals with FDCs' need to transfer active fire missions to their forward echelon FDCs for processing.

#### **a. Procedures for Stations Other than FDCs**

Figure 8-1 details the steps necessary for the MEF FFCC, FSCCs, and the DASC.

STEP	AGENCY	REMARKS
1	Forward Echelon	Forward echelon displaces and occupies the next position.
2	Forward Echelon	Transmits comm checks to all stations (goal to determine if station has comm). <b>ACK</b> or <b>NAK</b> is sufficient. Do not attempt to resynchronize with any station except main echelon.
3	Forward Echelon	When comm is established and synchronization is achieved with main echelon, forward echelon transmits the following to main echelon: <b>AFU;COMD with XMIT</b> <b>ALL DATA</b> <b>ALL FIRE UNITS</b> <b>TO:ME</b> <b>SPRT;COMD with XMIT</b> <b>ALL TYPES</b> <b>ALL NAMES</b> <b>TO:ME</b> <b>SYS;PTM:REQUEST NAMES OF CURRENT FIRE PLANS</b>
4	Main Echelon	Main echelon enters received <b>AFU;COMD</b> or <b>SPRT;COMD</b> . Names of all current fire plans are transmitted to forward echelon.
5	Forward Echelon	Forward echelon builds modification and associated files for fire plans. When files are ready, forward echelon transmits for each fire plan — <b>NNFP;COMD with XMIT</b> <b>PLAN</b> <b>TISF</b> <b>TO:ME</b>
6	Forward Echelon	When comm is established with all required stations and all files are updated, transmits <b>SYS;PTM</b> indicating forward is ready to take control.
7	Main Echelon	Transmits <b>SYS;PTM</b> indicating forward echelon has control, and — <ul style="list-style-type: none"> <li>• Deletes forward echelon from subscriber file.</li> <li>• Changes <b>OWN NAME</b> to that of forward echelon.</li> <li>• Enters main echelon as subscriber.</li> </ul>
8	Forward Echelon	Receives <b>SYS;PTM</b> indicating <b>MAIN</b> has relinquished control, and — <ul style="list-style-type: none"> <li>• Deletes main echelon from subscriber file.</li> <li>• Changes <b>OWN NAME</b> to that of main echelon.</li> <li>• Enters forward echelon as subscriber.</li> </ul>
9	All Subscribers	Without notice to other subscribers, forward assumed control leaving them out of synchronization. Otherwise, normal operations continue.

Figure 8-1. Procedure to Change Names for Stations Other than FDCs

### b. Procedures for FDCs

(1) Ensure that **FM;CFF**, **FM;SUBS**, and **FM;QF** are entered in the **COMM**, **PCLD** menu as **DISPLAY:YES** at both the main and forward echelon FDCs.

(2) The forward echelon FDC enters an abbreviated target block with the first number significantly in advance of the last number used. The purpose of this procedure is to avoid rejection of a fire mission transmitted from the main echelon FDC because of the use of a target number from the computer's target block.

(3) Steps for transfer of control are shown in figure 8-2.

STEP	AGENCY	REMARKS
1	FO	Transmits fire mission to main echelon FDC.
2	Main Echelon FDC	Main echelon FDC processes mission.
3	Forward Echelon FDC	Forward echelon FDC displaces and occupies next position.
4	Forward Echelon FDC	Transmits comm checks to all stations (goal to determine if station has comm). <b>ACK</b> or <b>NAK</b> is sufficient. Do not attempt to resynchronize with any station except main echelon FDC.
5	Forward Echelon FDC	When comm is established and synchronization is achieved with main echelon FDC, forward echelon FDC transmits the following to main echelon FDC: <b>AFU;COMD with XMIT</b> <b>ALL DATA</b> <b>ALL FIRE UNITS</b> <b>TO:ME</b> <b>SPRT;COMD with XMIT</b> <b>ALL TYPES</b> <b>ALL NAMES</b> <b>TO:ME</b> <b>SYS;PTM:REQUEST NAMES OF CURRENT FIRE PLANS</b>
6	Main Echelon FDC	Main echelon FDC enters received <b>AFU;COMD</b> or <b>SPRT;COMD</b> . Names of all current fire plans are transmitted to forward echelon FDC.

**Figure 8-2. Procedure to Change Names for FDCs**

STEP	AGENCY	REMARKS
7	Forward Echelon FDC	Forward echelon FDC builds modification and associated files for fire plans. When files are ready, it transmits for each fire plan — NNFP;COMD with XMIT PLAN TISF TO:ME
8	Main Echelon FDC	<p>a. Order fire units in FUSEL under forward echelon FDC's name.</p> <p>b. Recalculate all missions. Select —</p> <ol style="list-style-type: none"> <li>1. FIRE MISSION</li> <li>2. CFF</li> <li>3. RECALC</li> <li>4. Select TGT NUMBER</li> <li>5. Select ALTER</li> <li>6. Select ACTION, ENTER</li> </ol> <p>c. Fire mission is recalculated for FM;CENTER file processing and transmission to forward echelon FDC. Modify FM;CFF so that the same units are assigned to fire the same FFE munitions as originally determined. Transmit fire mission to forward echelon FDC.</p>
9	Forward Echelon FDC	When comm is established with all stations and all files are updated, transmits SYS;PTM indicating forward is ready to take control.
10	Main Echelon FDC	<p>Transmits any FM;SUBS to forward echelon FDC updating its fire mission file.</p> <ul style="list-style-type: none"> <li>• Receive FM;SUBS.</li> <li>• Display FM;SUBS.</li> <li>• Transmit displayed FM;SUBS to forward echelon FDC.</li> </ul>
11	Main Echelon FDC	<p>Transmits SYS;PTM indicating forward echelon has control and —</p> <ul style="list-style-type: none"> <li>• Deletes forward echelon FDC from subscriber file.</li> <li>• Changes OWN NAME to that of forward echelon FDC.</li> <li>• Enters main echelon FDC as subscriber.</li> </ul>
12	Forward Echelon FDC	<p>Receives SYS;PTM indicating main echelon FDC has relinquished control, and —</p> <ul style="list-style-type: none"> <li>• Deletes main echelon FDC from subscriber file.</li> <li>• Changes OWN NAME to that of main echelon FDC.</li> <li>• Enters forward echelon FDC as subscriber.</li> </ul>
13	All Subscribers	Without notice to other subscribers, forward assumed control leaving them out of synchronization. Otherwise, normal operations continue.

Figure 8-2 (continued). Procedure to Change Names for FDCs

### 8004. Continuous Use of the Forward Echelon's Logical Name

Figure 8-3 provides a description of forward echelon operations conducted while maintaining the forward echelon's logical name.

STEP	STATION	REMARKS
1	Forward Echelon	Forward echelon displaces.
2	Forward Echelon	Forward echelon emplaces and transmits <b>SYS;PTM:CC</b> (comm check) to all subscribers. Forward echelon troubleshoots until all stations are up by direct communications or relay.
3	Main Echelon	Upon receiving comm check from forward echelon, main echelon transmits all updates to forward echelon.
4	Main Echelon	After communications are established with forward echelon, main echelon directs any station transmitting call for fire to retransmit this to forward echelon. Goal is to complete any existing fire missions and not accept new missions at main echelon.
5	Forward Echelon	When all updates are received and all communications are up, forward echelon transmits <b>SYS;PTM:READY TO TAKE CONTROL</b> .
6	Main Echelon	Main echelon transmits <b>SYS;PTM:___</b> [forward echelon's logical name] <b>IS IN CONTROL</b> and turns off radios. Main echelon completes any fire missions and may stay on net to communicate with forward echelon.
7	Forward Echelon	Forward echelon transmits <b>SYS;PTM:___</b> [forward echelon's logical name] <b>IS IN CONTROL</b> as received from main echelon to all stations.
8	All Subscribers	Deletes all MOI for main echelon and reenters same MOI for forward echelon. During this step, all subscribers must be careful to manually transmit these messages to forward echelon until MOI setup is again complete.

**Figure 8-3. Conducting Operations While Maintaining Forward Echelon's Logical Name**

### 8005. Operation of the Alternate Regimental FDC

A battalion FDC, preferably the FDC of a battalion in GS, is assigned by the regimental FDC as alternate regimental FDC. This station assumes control of the regiment if the regimental main echelon FDC and forward echelon FDC are unable to operate due to casualties or hasty displacement.

**a. AFU Files**

The regimental FDC transmits all **AFU;UPDATES** and **AMMOs** for the regiment to the alternate regimental FDC. These are stored, and all batteries are assigned as **FM;CENTER** files under their battalion names. Those batteries not organic to the alternate regimental FDC's battalion are entered as exclusions in the **FM;XCLUDE** message.

**b. Support Files**

The alternate regimental FDC maintains the same support files as the regimental FDC. The regimental FDC transmits all support data to the alternate FDC.

**c. Communications Nets**

The alternate regimental FDC enters the Div FSC Net and all subscriber and legal message data.

**d. TPC Function**

The alternate regimental FDC places itself in **ATI MODE 3** and establishes level 3 **SRIs** with the regimental TPC for all **ARTY**, **MORTAR**, and **RKTMSL** type targets. Every two hours the alternate regimental FDC conducts a level 3 search for all **SUPPLY/AMMO**, **EQUIP/RADAR**, and **PERS/OP** targets. The following **ATI MOD FILE** entries are made:

(1) **ATI;FMMOD**. These entries are prepared to ensure that no fire missions are generated from the **ATI MODE 3** processing:

- **WTYP:99**
- **WSIZE:99**
- **WDOP:99**
- **RV:01**

(2) **ATI;SVMOD**. These entries are prepared to ensure that no combinations are generated from the **ATI MODE 3** processing:

- **TIMEX:01/00/00**
- **TIMEY:0090**
- **QMOD:40**
- **RV:375**
- **DNARV:50**
- **QMOD:40**
- **RPF:001**

### e. Assumption of Control

If the alternate regimental FDC is unable to communicate with the regimental FDC directly *and* all other battalion FDCs have lost communications for 10 minutes, the alternate regimental FDC assumes control of the regiment using the steps shown in figure 8-4.

STEP	STATION	MESSAGE	REMARKS
1	Alternate Regimental FDC		Decision is made to take control.
2	Alternate Regimental FDC	SYS;PTM	Transmits to all stations <b>SYS;PTM:_____</b> [alternate FDC's logical name] <b>IS IN CONTROL.</b>
3	Alternate Regimental FDC	Voice	Informs division FSCC of assumption of control and requests comm check on Div FSC Net.
4	Alternate Regimental FDC	FM;XCLUDE	Deletes exclusion of all fire units of regiment.
5	Alternate Regimental FDC	FM;MOD	Changes <b>ZONE</b> to the division zone and reinforcing unit to <b>BLANK.</b>
6	Alternate Regimental FDC	ATI;FMMOD ATI;SVMOD	Changes existing data to reflect TPC entries in MCFSS enclosure of operation order and requests any changes from division FSCC.
7	All Subscribers		Change all MOIs for regimental FDC to route same messages to battalion assuming control.

Figure 8-4. Procedure for the Alternate Regimental FDC to Assume Control

## 8006. Operation of the Alternate Battalion FDC

The battery BCS has a very limited capability to perform as a battalion FDC. If the battalion FDC is expected to be out of action for a long period of time, another BCT-equipped battalion *should* be assigned control of the battalion's batteries. Nevertheless, a battery FDC is selected and assigned as the alternate battalion FDC.

### a. Communications

The alternate battalion FDC communicates with the infantry regimental FSCC and the artillery regimental FDC by voice on the designated voice nets. The alternate battalion FDC communicates with the other batteries of the battalion by initiating *one* of the two following options.

(1) It directs batteries to communicate digitally with the alternate battalion FDC on the Bn FD Net.

(2) It directs the condensing of COF nets so that all batteries, FOs, and FSCCs operate on not more than two nets.

#### b. Fire Mission Mode

The artillery battalion and infantry regiment must operate in the FSCC Approval Mode to free the limited assets of the alternate battalion FDC from becoming involved in coordinating fires.

#### c. Assumption of Control

If the alternate battalion FDC is unable to communicate with the battalion FDC directly and all other battery FDCs and battalion FSCCs have lost communications with the battalion FDC for 10 minutes, the alternate battalion FDC assumes control of the battalion using the steps shown in figure 8-5.

STEP	STATION	MESSAGE	REMARKS
1	Alternate Battalion FDC		Decision is made to take control.
2	Alternate Battalion FDC	SYS;PTM	Transmits to all stations <b>SYS;PTM:_____</b> [alternate FDC's logical name] <b>IS IN CONTROL.</b>
3	Alternate Battalion FDC	Voice	Informs infantry regimental FSCC and artillery regimental FDC of assumption of control, and requests voice comm checks on Regt FSC Net and Regt FD Net or appropriate voice nets.
4	Other Battery FDCs	SYS;INIT	Enters the alternate battalion FDC logical name in <b>FSOXMIT</b> field.
5	Other Battery FDCs	SYS;COMM SYS;SBT	Makes necessary software changes to reconfigure nets and enters device type <b>V</b> for the alternate battalion FDC.
6	Battalion FSCCs	SYS;PTM	Directs observers to switch to FSCC Approval Mode.

**Figure 8-5. Procedure for the Alternate Battalion FDC to Assume Control**

**d. Tactical Fire Direction**

The alternate battalion FDC continues to answer calls for fire from battalion FS CCs and FOs. It also monitors all calls for fire received by other battery FDCs via MOI, following the steps shown in figure 8-6 to conduct tactical fire direction.

STEP	STATION	MESSAGE	REMARKS
1	Battery FDC	FM;CFF	Receives FM;CFF from battalion FS CC after it clears mission. Executes FM;CFF. BCS automatically transmits MOI FM;CFF to FSOXMIT address.
2	Alternate Battalion FDC	FM;CFF	MOI FM;CFF with SB field indicating transmitting battery is received. Examines TYPE, SIZE, and location. If decision to mass on target is made, go to step 3. Decision not to mass is indicated by silence.
3	Alternate Battalion FDC	SYS;PTM	Transmits fire order to battery that sent FM;CFF: — UNIT TO FFE UNIT TO ADJ SPEC INSTR NUMBER OF RDS SH/FZ I/E TGT NUMBER Fire order standards (unless changed by controlling FDO) are — Unit to fire: Battalion Unit to adjust: Must be receiving battery Special instructions: When ready Number of rounds: 1 Shell/fuze: HEF/TIB Target number: No standard
4	Initiating Battery FDC	SYS;PTM	Receives fire order, entering — FM;CFF:M; SH:___ [per fire order] FZ:___ [per fire order] CONT:___ [per fire order] UFFES:___ [units to FFE or ALL per fire order]

**Figure 8-6. Procedure for the Alternate Battalion FDC to Conduct Tactical Fire Direction**

STEP	STATION	MESSAGE	REMARKS
5	Initiating Battery FDC	FM;CFFOs, BCS Fire Commands	Fire mission chain displays FM;CFF followed by FM;CFFOs for each battery and fire commands for guns. Reviews and transmits each FM;CFFO, then BCS fire commands. (If mission is adjust fire mission, original FM;CFFOs display MF:DNL. FM;CFFOs are generated again for FFE with MF:WR or AMC.)
6	Initiating Battery FDC	FM;FOCMD	All FM;FOCMDs are routed to initiating FDC. Transmits first SHOT and last RDCOMP.
7	Initiating Battery FDC	FM;EOM	When EOM is received, FM;EOM messages are generated to all units that fired.
8	Initiating Battery FDC	Voice	Submits target number, TYPE, and surveillance to battalion FSCC.
9	Battalion FSCC	AFU;MFR	Completes and transmits AFU;MFR to regimental FSCC.

Figure 8-6 (continued). Procedure for Alternate Battalion FDC to Conduct Tactical Fire Direction

(reverse blank)

## **Chapter 9**

# **Continuity of Operations**

### **9001. Overview**

Automated operations is the primary method for the operations of all stations in MCFSS. It is expected, however, that computer and communications equipment will fail from time to time. The ongoing nature of fire support operations requires that sufficient redundancy be built into the system to preclude an interruption in fire support.

### **9002. Communications**

Data communications are susceptible to failure from loss of signal, failure of communications equipment, and computer loss or damage. The following rules should be used to cope with communications degradation.

#### **a. Troubleshoot Immediately**

- (1) Troubleshoot equipment at your station. Examine all radio and remote control unit settings. Check cables and antennae. Ensure cryptographic equipment fills are still intact.
- (2) Examine computer net data for appropriate settings. Change these settings only at the direction of the NCS.
- (3) Ensure correct subscriber data is entered and the status of the subscriber is **ON**. An incorrect device type associated with a subscriber changes some message routing and formatting.

#### **b. Examine Alternate Communications Paths**

- (1) When troubleshooting fails, relay communications can solve communications problems with a single station. This is a potential solution when an intermediate station can communicate with a non-communicating subscriber. The NCS approves relays and assigns relay addresses as required. The relaying station directs the implementation of the relay.

(2) If voice, but not digital, communications are possible, consider placing the voice station(s) on a single net. This may require the transfer of other computer stations from an existing data net to another data net to create the voice-only net. Avoid mixing voice and data communications on the same net.

### **9003. Levels of System Degradation**

#### **a. Computer Operations with Partial Voice Communications**

Establish voice communications with all subscribers. Reconfigure the nets to provide voice and data nets as required. Collapse nets to free equipment and make space for changes. All stations continue to process data using the computers entering data from the keyboards.

#### **b. Computer Operations with Total Voice Operations**

Convert all nets to voice operations. Use computers at all stations to process data manually entered by the operator.

#### **c. Conversion to Manual and Voice Operations**

The failure of numerous stations may require conversion to traditional operations. Refer to the FMFM 6-9, *Marine Artillery Support*, FMFM 6-18, *Techniques and Procedures for Fire Support Coordination*, or appropriate U.S. Army field manuals (FMs) for these procedures.

### **9004. Redundancy**

Loss of computer operations results in the loss of all computer stored data which can be catastrophic. The following procedures minimize the loss of data caused by computer failure.

**a.** Record data bases after the input of new data and at the intervals prescribed by unit SOP.

**b.** Print data base files and keep the printouts up-to-date. File these separately from the journal. At a minimum, the following files are printed based on the device.

**(1) At the BCS, print the following data base files:**

- **SYS;COMM**
- **SYS;SBT**
- **AFU;UPDATE**
- **AFU;AMMO**
- **AFU;REG**
- **all SPRT;BGEOMs**
- **all SPRT;ZONES**
- **all targets and known points**
- **all met messages**

**(2) At the IFSAS LCU or BCT, print data base files based on the plan.**

**(a) For the current plan, print the following data base files:**

- **SYS;1201**
- **AFU;2203**
- **SPRT;7201**
- **FM;5204**
- **all observers**
- **all targets and known points**
- **ATI;8213**

**(b) For each fire plan, print the following data base files:**

- **AFU;2203**
- **SPRT;7202**
- **NNFP;4221**
- **all target lists**

**(reverse blank)**

## **Appendix A**

### **Naming of Geometry**

- 1. Support files are used by all stations in MCFSS. Because of their universal nature, a naming convention must be established to ensure understanding and lack of duplication.**
- 2. Geometry names use not more than six characters. These six characters are split to provide the following three pieces of information:**
  - a. The first two characters designate the type of geometry:**
    - AC = Airspace coordination area (ACA)**
    - CH = Chemical hazard area**
    - CL = Coordinated fire line (CFL)**
    - DA = Damage assessment area**
    - DS = Dead space are (DSA)**
    - FF = Free fire area**
    - FL = Forward line of troops (FLOT)**
    - FS = Fire support coordination line (FSCL)**
    - NF = No fire area**
    - OB = Objective area**
    - RF = Restricted fire area (RFA)**
    - RL = Restricted fire line (RFL)**
    - TV = Target value area (TVA)**
    - ZO = Zone**
  - b. The third character is a numerical sequencing of the geometry input. For example, the first RFA established by an agency is number 1. Number 1 may be updated or completely deleted and replaced with number 2.**
  - c. The fourth, fifth, and sixth characters are the tag name of the unit that established the geometry (see appendix B).**

d. Examples:

**ZO12MD** = The first **ZONE** established by 2d Marine Division.

**FL27MR** = The second **FLOT** established by 7th Marines.

**DS4E11** = The fourth **DSA** established by Battery E, 11th Marines.

**RF21A8** = The second **RFA** established by 1st Battalion, 8th Marines.

## Appendix B

### Unit Tag Names

1. Tag names are three-character abbreviations used to identify units in message data fields with limited space. Tag names are used in the **FSCoord** fields of support messages as well as in the naming of fire plans and geometry.

2. The following rules apply:

a. Regimental and larger size units are identified by the numerical designation followed by two characters identifying the unit size. The following unit size designators are used:

**MF** = MEF

**FF** = MEF forward

**U** = MEU

**MD** = Marine division

**MR** = Marine regiment

b. Regiments with two digit designation (i.e. 23d Marines) use the number followed by **M**. For example, 23d Marines is **23M**.

c. Battalions use their abbreviated battalion name (e.g., 1/5) with the letter **A** replacing the virgil (/). For example, 1st Battalion, 5th Marines is **1A5**.

d. Battalions of regiments numbered higher than 9 use the entire abbreviated battalion name (e.g., 1/25) omitting the virgil (/). For example, 1st Battalion, 24th Marines is **124**.

e. Separate battalions use the battalion number followed by two letters from the following list identifying the battalion. For example, 1st Tank Battalion is **1TK**.

**AA** = assault amphibian battalion

**CE** = combat engineer battalion

**LA** = light armored reconnaissance battalion

**TK** = tank battalion

**f.** Artillery firing batteries use the battery letter followed by the regiment number. For example, Battery D, 10th Marines is **D10**.

**g.** Forward observers use the letters **FO** followed by the letter of the supported infantry company. For example, the FO for Company C, 1st Battalion, 6th Marines is **FOC**.

**h.** The TPC uses the letter **T** followed by the artillery regiment's number. For example, 11th Marines' TPC is **T11**.

## Appendix C

# Naming Fire Plans

1. Fire plans are named using six characters and the following convention.

2. The first two letters indicate the type of plan:

**CA** = countermechanized (armor) program  
**CF** = counterfire program  
**CP** = counterpreparation  
**FA** = FASCAM  
**GP** = group  
**MO** = countermobility program  
**OC** = on-call plan  
**PP** = preparation fire  
**QK** = quick fire plan  
**SA** = suppression of enemy air defense plan  
**SE** = series  
**TB** = target bulletin

3. The third character is a numerical sequencing of the fire plans as they are entered. For example, the first preparation fire established by an agency is **PP1**.

4. The fourth, fifth, and sixth characters are the tag name of the unit that established the geometry (see appendix B).

5. Examples:

**SE21A6** = The second series established by 1st Battalion, 6th Marines.

**CF1T10** = The first counterfire program established by 10th Marines  
TPC.

**PP12MD** = The first preparation fire established by 2d Marine Division.

(reverse blank)

## **Appendix D**

# **ATI Function**

### **1. General**

The **ATI** program is designed to perform fire plan and counterfire targeting. This appendix is intended as a supporting document to provide the supervisor a basic knowledge of the workings of the **ATI** function.

### **2. ATI Reports**

A number of reports may be submitted by various target acquisition agencies. Most of these are stored with a target number in the **ATI** file at the mode 3 computer. To call these targets is premature since they may not represent targetable information.

#### **a. Reports Constituting a Target**

The following received reports are stored as targets in the mode 3 computer:

(1) **ATI;CDR**. This is a report of a target using grid locations which may be generated at a BCT, LCU, BCS, DCT, Q-36, or JSTARS.

(2) **ATI;AZR**. This is a report of a target using polar location which may be generated at a BCT, LCU, BCS, or DCT.

(3) **ATI;SHR**. This is a report of the results of a crater analysis which may be generated at a BCT, LCU, BCS, or DCT.

(4) **ATI;MFR**. This is a report of the attack of a target which may be generated at a BCT or LCU.

(5) **AFU;MFR**. This is a report of the attack of a target which may be generated at a BCT or LCU.

(6) **ATI;TGR**. This is a report format used by the BCT/LCU computer to store targets.

**b. Other Reports**

Two other **ATI** reports may be received, but are not stored as targets and do not update existing targets:

(1) **ATI;CBTI**. This is a free text report of activity at an existing target.

(2) **ATI;SVL**. This is a free text report of enemy activity but does not use a target number.

**c. Processing**

The following processing occurs for incoming reports:

(1) If no **DTG** is entered, the report is assigned the current system **DTG**.

(2) If no target number is entered, the target is assigned the next target number from the computer's target block.

(3) The **DTG** of the report is compared with the **MAX REPORT AGE (TIMEX)** entered in the **ATI;SVMOD** message. If the report is older than the age limit, it is output to the alert queue without updating the target file.

(4) If the report is a target update and there are no blocks to processing, the target is updated. If updated target is a solution or a constituent, the operator is warned, and a constituent report is output.

(5) If delete is specified with additional data, that data is deleted from the target on file.

(6) If delete is specified with no additional data and there are no blocks to processing, the target is deleted. If the deleted target is a solution, all constituents are deleted. (If a solution is to be deleted without deleting the constituents, use **ATI;SPLIT** message.) If all constituents are deleted without deleting the solution report, the solution is renamed as a constituent without an agency.

(7) All locations are converted to grids and checked against the map modification.

### **3. ATI MOD FILE**

The **ATI MOD FILE** is composed of five messages.

#### **a. ATI;SVMOD**

**ATI;SVMOD** format is used to specify criteria to control the number of automatic target combinations. Each incoming target must meet these criteria before being considered for combination with another target. Criteria include proximity, target similarity, and differences in report time.

**(1) MAXIMUM REPORT AGE (TIMEX)** specifies the maximum acceptable time difference between the present time on the BCT and the time of sighting of each target report. The software will not accept a value less than 1 day. **MONTH** is the number of days in the last month.

**(2) MAXIMUM ACCEPTABLE TIME DIFFERENCE (TIMEY)** specifies the maximum difference in time between two reports considered for combination.

**(3) MAXIMUM REPORT VALUE (RV)** specifies the largest report value (radial error in accuracy of location measured in meters) acceptable to allow a report to be considered for combination. This value is also automatically entered in **ATI** target reports that are received with an **RV** but not an **AGENCY** entry.

**(4) DO NOT ADJUST REPORT VALUE (DNARV)** is the largest radial error in meters acceptable to consider the target location reported sufficiently accurate to not adjust the grid based on related reports when combination occurs.

**(5) MAXIMUM DEGREE OF PROTECTION DIFFERENCE (DOPMOD)** is the maximum degree of protection difference that two personnel targets may possess and still be combined. Since personnel targets can change their degree of protection rapidly, a larger value should be used. This value affects the resolution factor computed for a pair of targets.

**(6) COMPARISON LIMIT (QMOD)** specifies target comparison limits. This factor is explained in detail in paragraph 6.

(7) **RELATIVE PROXIMITY FACTOR (RPF)** specifies combination limitations based on distance between targets. It is not a distance, but a variable factor used in an equation. The higher the factor, the farther targets can be apart and still combine.

**b. ATI;FMMOD**

**ATI;FMMOD** format is used to establish criteria for the automatic generation of fire missions. The BCT uses four fire mission criteria to selectively generate fire missions on incoming **ATI** reports. The target must meet or exceed all four criteria to generate a mission. These criteria are report value (**RV**), weighted type (**WTYP**), weighted degree of protection (**WDOP**), and weighted size (**WSIZE**). **RV** is determined by the computer using a series of look-up tables which reflects the ability of each of 20 different target acquisition agencies to determine the location of 17 different target types (**RV** is modified using the **ATI;STAT** format, see paragraph 3c). **WTYP**, **WDOP**, and **WSIZE** are a series of combining weights for each target in terms of the acquiring agency's ability to accurately describe the target type, degree of protection, and size. Values range from 0 to 99. The higher the value entered, the more restrictive the measure; e.g., if 99 is entered, no targets can qualify.

**c. ATI;STAT**

The **ATI;STAT** format is used to modify the report accuracy, range error, and location error of up to 18 target location agencies for each of 17 target types.

**d. ATI;TBMOD**

The **ATI;TBMOD** is used to establish criteria for determining the number of targets needed in an area to constitute a target buildup. Target buildup criteria can range from 0 to 99. The incoming target counts as 1. For example, with a target buildup criteria of 5, the computer must find four other targets within 0.5, 1, or 1.5 kilometers of the incoming target to generate an **ATI;8208** target buildup report. The computer searches these radii until the required number of targets is found and then stops the search; i.e., if a buildup exists within 0.5 kilometer, the search is not extended beyond that radius.

**e. ATI;DPMOD**

The **ATI;DPMOD** message is used to regulate the number of **ATI** output reports (8202, 8203, 8204, 8205, and 8207). These reports can be too much to handle during surge operations and are considered to be high-volume reports.

**4. Numerical Values**

Decisions made during target processing to resolve duplications or to fire a received target must be reduced to criteria the computer can use in duplicating these decisions. These criteria are entered in the form of numerical factors which must be monitored and updated by supervisors at the mode 3 stations.

**a. REPORT VALUE (RV)**

**RV** is the radial error that is expected of the average operator or member of the reporting agency. MCFSS recognizes 20 target acquisition agencies and 17 target types. MCFSS assigns a default error based on the assumed average ability of the agency to locate each target type. It is assumed that the report value, as a radius, defines the area in which the target may actually lie.

**b. RANGE ERROR**

**RANGE ERROR** is an assumed accuracy in estimating distances by the four human agencies (**FO**, **FOWOL**, **OBSR**, and **LRRP**).

**c. AZIMUTH ERROR**

**AZIMUTH ERROR** is an assumed error in determining direction by the four human agencies.

**d. LOCATION ERROR**

**LOCATION ERROR** is a radial error in meters assumed to be the accuracy with which the human agencies can determine their own location.

#### **e. Altering Default Values**

These assigned accuracies can be altered for any agency (but not individuals of the agency) using the **ATI;STAT** message.

### **5. Factors Governing Fire Mission Output**

As mentioned in paragraph 3b, the **ATI;FMMOD** message governs fire mission output.

#### **a. Reports Considered**

Reports considered may be limited to the following:

- (1) **COORDINATE REPORTS** causes all targets located by grids to be examined as potential fire missions.
- (2) **SOLUTION REPORTS** causes only the results of combinations to be examined as possible fire missions.
- (3) **ALL TARGET REPORTS** causes every incoming target to be examined.

#### **b. MAX REPORT VALUE**

**MAX REPORT VALUE** is the smallest error in accuracy of the target location not acceptable for consideration for processing as a fire mission.

#### **c. MINIMUM COMBINING WEIGHT**

The ability of each target acquisition agency to accurately locate and identify targets varies from agency and target type. MCFSS uses a system of weighted values to define the agency's ability. The numbers assigned are a result of a research effort that began with the inception of the Army's TACFIRE system. A combining weight is available for each agency with respect to target type/subtype, size, strength, and degree of protection (applicable to personnel-type targets only). The specific value means nothing by itself. However, the higher the value, the more accurate and more reliable the target description and identification. The numbers are really intended to be used as comparisons of relative worth. An agency reporting a target that yields a combining weight of 49 is more reliable than an agency that yields a combining weight of 10. The combining weights are published in the combining weight tables in appendix F.

**d. Determination of ATI;FMMOD Criteria**

Figure D-1 can be used to translate targeting and commander's criteria in values for the ATI;FMMOD message. Entries made in the ATI;FMMOD should be derived from the commander's HPT list and/or priority target list.

STEP	REFERENCE	ACTION
1	High Payoff Target List or Priority Target List	Determine HPTs or priority targets as issued by commander.
2	Target Type/Subtype List	Convert HPTs and priority targets to their TACFIRE equivalents.
3	Target Acquisition Agency List	Determine TACFIRE equivalent for the target acquisition agency that will locate each target type.
4	Combining Weight Table	Enter combining weight table with each target acquisition agency and each target type. Extract combining weight values for type, size, and DOP.
5		Select the lowest factor for type, size, and DOP from those extracted.
6		Subtract 1 from each of the factors in step 5 to determine the values for entry into the computer.
7	ATI;FMMOD	Enter the values from step 6 for WTYPE, WDOP, and WSIZE.
8	ATI;COMD	Print the accuracy table.
9	ATI;8214	Determine the accuracy (RV) in meters of each agency from step 3 locating each target type from step 2.
10		Select the largest RV from step 9.
11		Add 1 to the value from step 10.
12	ATI;FMMOD	Enter the value from step 11 as RV:__ in the ATI;FMMOD.

**Figure D-1. Procedure for Translating Targeting and Commander's Criteria**

**e. Requirements to Generate a Fire Mission**

An incoming report must pass all of the following tests to output a fire mission.

- (1) The incoming report must be a type report specified in the **ATI;FMMOD** message that is selected for examination.
- (2) Based on the agency locating the target and the target type, the incoming report must be assigned a combining weight for type greater than the **WTYP** entry in the **ATI;FMMOD** message.
- (3) Based on the agency locating the target and the target size, the incoming report must be assigned a combining weight for size greater than the **WSIZE** entry in the **ATI;FMMOD** message.
- (4) If the target type is personnel, based on the agency locating the target and the reported degree of protection, the incoming target must be assigned a combining weight for **DOP** equal to or greater than the **WDOP** entry in the **ATI;FMMOD** message.
- (5) Based on the agency locating the target and the target type, the incoming report must possess a report value less than that entered as the **MAX RV** in the **ATI;FMMOD** message.

## 6. Factors Governing Combination of Targets

As reports of targets are received, each new target is compared to those targets in the computer's target file. A number of factors are used as tests to determine if the target should be combined with any existing targets.

### a. Proximity Factor (*U*)

This is the ratio of the distance (*d*) between the reported target locations and the sum of the report accuracies of the agencies that reported the targets. The formula for proximity factor is:

$$U = \frac{d}{RV_1 + RV_2}$$

A proximity factor of 1 or less is required to cause targets to combine. The following three possible results could occur for any two compared targets.

- (1) A value of 1 indicates that the circles described by the two reporting agencies' possible error (report values) are tangent. If the reports are of the same target and the target combines, an assumption can be made that the solution target lies at the point that the two circles touch.
- (2) A value less than 1 indicates that the circle defined by the report values overlap, and the solution target possibly lies within the overlap.
- (3) A value greater than 1 indicates that the distance between the compared target locations is greater than the sum of the radii of the **RV** circles. Even based on the most inaccurate report assumed possible for each agency, the targets could not be the same.

**b. Degree of Protection Difference**

The degree of protection difference is a numerical value entered in the **ATI;SVMOD** message and compared to that computed for a pair of targets being considered for combination. Entries are 1 through 9 with 9 representing the least similarity in reported degrees of protection and 1 being identical degrees of protection.

**c. QMOD**

**QMOD** is a value entered in the **QMOD** field of the **ATI;SVMOD** message. This value is compared to the tactical factor (*Q*) computed by the computer for each pair of compared targets. If the value of *Q* is greater than **QMOD**, the targets will combine. The following factors are used in this comparison.

(1) **Relative Proximity Factor (RPF)**. *RPF* is a factor, vice distance, that the computer uses in the determination of the tactical factor that is computed and assigned to a target. The *RPF* may be altered by the operator by making an entry in the *RPF* field of the **ATI;SVMOD** message. Otherwise, the computer uses a default value of 300. Though other factors also affect combination, when taken alone, the following rules apply to *RPF*.

- (a) Increasing the value for *RPF* increases the number of combinations that will occur.

(b) Decreasing the value of *RPF* decreases the number of combinations that occur.

(2) **Resolution Factor ( $R_s$ ).**  $R_s$  is a computer assigned value that indicates the degree of similarity between two targets being compared. A value of 4.0 indicates exact match in target type while 0.0 indicates completely dissimilar target types. This factor is generated for each compared target and cannot be changed by the operator.

(3) **Tactical Factor ( $Q$ ).**  $Q$  is a numerical value assigned to the target based on its relative importance in the tactical situation. The value of  $Q$  is determined by the computer through the following formula shown. Refer to the formula. Note that the value of  $Q$  is a modified value of  $R_s$ . The quantity  $U$  plus the ratio  $d$  divided by *RPF* is subtracted. The following deductions can be made:

$$Q = R_s - \left( U + \frac{d}{RPF} \right)$$

(a) Decreasing the value of *RPF* increases the value of the ratio  $d$  divided by *RPF*. Consequently, a larger value results when the ratio is added to  $U$ . This sum is subtracted from the value of  $R_s$  yielding a smaller value of  $Q$ . Increasing the value of *RPF* has the opposite effect. Thus the larger the *RPF*, the more likely they are to combine.

(b) A larger distance between the reported target locations ( $d$ ), has a similar effect as a small *RPF*, making the ratio  $d$  divided by *RPF* a larger value. It also results in a larger value of  $U$  (see proximity factor above). A larger value of  $d$  decreases the value of  $Q$  by causing a greater quantity to be subtracted. A smaller  $d$  has the opposite effect. Thus the closer targets are, the more likely they are to combine.

(c) The more similar the targets, the greater the value of  $R_s$  that is assigned. The larger the  $R_s$ , the larger the  $Q$  (the remainder after subtraction) will be. Thus, more similar targets combine more frequently.

(4) **Maximum Separation Distance ( $D_s$ ).**  $D_s$  is the greatest distance in meters between two targets that will combine. This distance is computed using the lesser value developed from two formulas:

$$D_s = \frac{(R_s - QMOD)(RPF)(RV_1 + RV_2)}{RPF + RV_1 + RV_2}$$

$$D_s = RV_1 + RV_2$$

Though maximum separation distance is not directly involved in the  $Q$  formula, the maximum separation distances for all possible combinations of factors are listed as solutions of the max distance formulas and tabulated in the Separation Distance Tables in appendix G. The Separation Distance Tables provide a tool for determining the values of  $RPF$  and  $QMOD$  for entry into the  $ATI;SVMOD$ .

(a) The Separation Distance Tables may be divided into sections for reference. Figure D-2 shows a section of one of the tables labeled for explanation.

- **A** is a column labeled "INDEX." The index numbers represent the value of  $QMOD$  in the maximum separation distance formula.
- **B** is the body of the table. These values represent separation distances based on the entry arguments on the left and top of the table.
- **C** is the value of  $RPF$  for this part of the table. The separation distance table is divided into parts based on values of  $RPF$  beginning with 50 and increasing in increments of 50. The last table given is for  $RPF$  999.
- **D** is a heading that lists two report values. These are  $RV_1$  and  $RV_2$  in the max separation distance formula. If the report values are not listed, two listed values with the same sum will produce an accurate solution; e.g., 150 and 350 are not listed but 100 and 400 will yield the same answer.

RV1	10	10	10	35	35	50	10	35	50	10	50	
RV2	10	35	50	35	50	50	100	100	100	150	150	D
INDEX	RPF 150											
4.0	0	0	0	0	0	0	0	0	0	0	0	C
3.5	8	17	21	23	27	30	31	35	37	38	42	
3.0	17	34	42	47	54	60	63	71	75	77	85	
2.5	20	45	60	70	81	90	95	106	112	116	128	
2.0	20	45	60	70	85	100	110	135	150	160	200	
1.5	20	45	60	70	85	100	110	135	150	160	200	
0.0	20	45	60	70	85	100	110	135	150	160	200	
-0.5	20	45	60	70	85	100	110	135	150	160	200	
-1.0	20	45	60	70	85	100	110	135	150	160	200	A

Figure D-2. Extract of Separation Distance Table

- $R_s$  is represented in the table by renumbering the *QMOD* column beginning at the value of *QMOD* with  $R_s$  4.0 and decreasing by 0.5 at each index number until the top of the table is reached. The numbered values of  $R_s$  represent the range of  $R_s$  in which combinations will take place. In figure D-3, E is the renumbered  $R_s$  column for a *QMOD* of 2.0. Combinations can take place within a range of  $R_s$  from 4.0 to 2.0.

RV1	10	10	10	35	35	50	10	35	50	10	50	
RV2	10	35	50	35	50	50	100	100	100	150	150	
INDEX	RPF 150											
<del>4.0</del> 2.0	0	0	0	0	0	0	0	0	0	0	0	
<del>3.5</del> 2.5	8	17	21	23	27	30	31	35	37	38	42	
<del>3.0</del> 3.0	17	34	42	47	54	60	63	71	75	77	85	
<del>2.5</del> 3.5	20	45	60	70	81	90	95	106	112	116	128	
<del>2.0</del> 4.0	20	45	60	70	85	100	110	135	150	160	200	
1.5	20	45	60	70	85	100	110	135	150	160	200	
0	20	45	60	70	85	100	110	135	150	160	200	
-0.5	20	45	60	70	85	100	110	135	150	160	200	
-1.0	20	45	60	70	85	100	110	135	150	160	200	E

Figure D-3. Example of Separation Distance Table with  $R_s$  Numbered

(b) **Examples of the Use of the Separation Table.** The separation distances in the body of the separation tables may be divided into two cases. Examination of the table in figure D-3 with report values of 10 and 10 shows increasing values of max distance from 0 to 17. The next listed value is 20, and that number is unchanging for the remainder of the table. The changing values are the result of the following maximum distance formula:

$$D_S = \frac{(R_S - QMOD)(RPF)(RV_1 + RV_2)}{RPF + RV_1 + RV_2}$$

The unchanging values result from the following formula:

$$D_S = RV_1 + RV_2$$

- **Example 1.** A target is filed in the computer from an agency with a report value of 35. A new report is received with a report value of 50 and the computer assigns a resolution factor of 3.5. The **ATI;SVMOD** message has **RPF** 150 and **QMOD** 2.0. The maximum distance (see figure D-2) can be computed as follows. (If the solution to the equation is a negative value, the two targets cannot be combined.)

$$D_S = \frac{(R_S - QMOD)(RPF)(RV_1 + RV_2)}{RPF + RV_1 + RV_2}$$

$$D_S = \frac{(3.5 - 2.0)(150)(35 + 50)}{150 + 35 + 50}$$

$$D_S = 81$$

- **Example 2.** A target is filed in the computer from an agency with a report value of 10. A new report is received with a report value of 50 and the computer assigns a resolution factor of 3.5. The **ATI;SVMOD** message has *RPF* 150 and *QMOD* 2.0. The maximum distance (see figure D-2) can be computed as follows. (If the solution to the equation is a negative value, the two targets cannot be combined.)

$$D_S = RV_1 + RV_2$$

$$D_S = 10 + 50$$

$$D_S = 60$$

#### d. Combination Tests of Incoming Targets

Incoming targets must pass *all* of the following tests to result in a combination. (Targets reported by JSTARS cannot be combined by the computer or the operator. Additionally, targets marked as **DO NOT COMBINE** cannot be automatically combined. Nor can two targets combine if both are marked as **DO NOT ADJUST**, since their locations cannot be adjusted to produce a solution target location.)

- (1) The time difference in the two reports' DTGs must be less than the value entered in **MAX TIME DIFFERENCE (TIMEY)** in the **ATI;SVMOD** message.
- (2) The value of the proximity factor (*U*) must be equal to or less than 1.
- (3) The value of tactical factor (*Q*) computed for the target must be greater than that entered in *QMOD* of the **ATI;SVMOD** message.

### 7. Determination of *QMOD* and *RPF*

Agencies that write operations orders and supervisors of **ATI MODE 3** operations must both be able to translate commander's criteria and S-2 guidance into values for the **ATI;SVMOD** message. Figure D-4 provides a method for using the Maximum Separation Distance Tables.

STEP	REFERENCE	ACTION
1		Select 2.0 for resolution factor ( $R_s$ ).
2		Arbitrarily select value for relative proximity factor ( $RPF$ ). This may be changed later.
3	Maximum Separation Distance Table	Enter table with $RPF$ selected in step 2. Renumber $R_s$ column at left by crossing out value selected in step 1 and pencilling in 4.0. Renumber the remainder of the table toward the top, decreasing by 0.5 until reaching the top of the table or the pencilled number 0.0. This indicates that combinations will take place in the range from tactical factor ( $Q$ ) of 4.0 to the last pencilled value.
4		Examine table to determine if distance between targets for varying agencies is acceptable. Enter top of table with two agencies' RV. With varying values of $R_s$ , cross index from the left and extract the maximum distance the two reports may be separated and still combine.
5		If the solution determined in step 4 is satisfactory, go to step 8. If the decision is made to decrease the maximum distance, go to step 6. If the decision is made to increase the maximum distance, go to step 7.
6		To decrease the maximum distance, select a lower value of $RPF$ or greater value of $R_s$ (or both) and repeat steps 3 through 5. After a satisfactory solution is determined, go to step 8.
7		To increase the maximum distance, select a higher value of $RPF$ or lesser value of $R_s$ (or both) and repeat steps 3 through 5. After a satisfactory solution is determined, go to step 8.
8		When a satisfactory solution has been determined, $RPF$ is the last $RPF$ value used and selected $R_s$ is $QMOD$ .

Figure D-4. Method for Using Maximum Separation Distance Tables

## 8. ATI Output Reports

Figure D-5 indicates the ATI report output and required circumstances.

REPORT NAME	OUTPUT WHEN	DPMOD ENTRY	DATA PROVIDED IN REPORT
<b>ATI;8201 COMBINATION REPORT</b>	Incoming report is automatically combined with existing report.	None	Incoming report, existing report, and solution are printed in level 3 output. Statistical test results are provided for proximity, resolution, and tactical factors.
<b>ATI;8202 RECOMMENDED FOR COMBINATION REPORT</b>	Incoming report and existing report pass statistical tests for combination but were not combined because another set had better overall agreement.	<b>PRINT RECOMMENDED FOR COMBINATION REPORT:YES</b>	Incoming report and recommended-for-combination-with reports are printed in level 3 output. Statistical test results are provided for proximity, resolution, and tactical factors.
<b>ATI;8203 RECOMMENDED FOR INSPECTION REPORT</b>	Incoming report and existing report pass statistical tests for combination but were not combined because one target had <b>DNC:X</b> ; marked or both had <b>DNA:X</b> ; marked.	<b>PRINT RECOMMENDED FOR INSPECTION REPORT:YES</b>	Incoming report and recommended-for-inspection reports are printed in level 3 output. Statistical test results are provided for proximity, resolution, and tactical factors.
<b>ATI;8204 INCOMPATIBILITIES REPORT</b>	Incoming report and existing report(s) within 1 kilometer of incoming location fail statistical tests for combination.	<b>PRINT INCOMPATIBILITIES REPORT:YES</b>	Incoming report and incompatible-with reports are printed in level 3 output. Statistical test results are provided for proximity, resolution, and tactical factors.

Figure D-5. ATI Report Processing

REPORT NAME	OUTPUT WHEN	DPMOD ENTRY	DATA PROVIDED IN REPORT
<b>ATI;8205 IN FAN REPORT</b>	Incoming report location plots within $\pm 50$ mils of azimuth reported in <b>ATI;SHR</b> and incoming target type matches <b>ATI;SHR</b> weapon and caliber.	<b>PRINT IN FAN REPORT: YES</b>	Incoming report correlates with <b>ATI;SHR</b> data printed in <b>ATI;TGR</b> format.
<b>ATI;8206 INTERSECTING RAYS REPORT</b>	Incoming <b>ATI;SHR</b> azimuth and azimuth of existing report intersect to predict possible weapon location.	<b>PRINT INTERSECTING RAYS REPORT: YES</b>	Incoming report and intersects report printed in level 3 format with grid of intersection.
<b>ATI;8207 CONSTITUENTS REPORT</b>	Generated when targets are combined at operator direction or are automatically combined.	<b>PRINT CONSTITUENTS REPORT: YES</b>	Existing solution and constituents in level 3 format.
<b>ATI;8208 TARGET BUILDUP REPORT</b>	Generated when incoming report and existing targets within 1.5 kilometers equal or exceed number of targets to constitute buildup as established in <b>TBMOD</b> message.	None required	Number of targets found and grid and radius of each target from incoming report.
<b>ATI;8209 QUERY REPORT</b>	Generated in response to an <b>ATI;QUERY</b> message.	None required	Number of targets satisfying level 1 request, one line report of each target for level 2 request, and complete output report for level 3 request.

Figure D-5 (continued). ATI Report Processing

<b>REPORT NAME</b>	<b>OUTPUT WHEN</b>	<b>DPMOD ENTRY</b>	<b>DATA PROVIDED IN REPORT</b>
<b>ATI;8210 SRI REPORT</b>	Generated when an incoming target matches criteria established in SRI.	None required	Number of targets satisfying level 1 request, one line report of each target for level 2 request, and complete output report for level 3 request.
<b>ATI;8211 ATI;SITUATION REPORT</b>	Generated when <b>ATI;COMD</b> message is entered with options <b>PRINT</b> and <b>SITREP</b> .	None required	Number of targets satisfying level 1 request, one line report of each target for level 2 request, and complete output report for level 3 request.
<b>ATI;8212 RETRIEVAL REPORT</b>	Generated in response to <b>ATI;SRCH</b> message.	None required	Number of targets satisfying level 1 request, one line report of each target for level 2 request, and complete output report for level 3 request.
<b>ATI;8213 ATI MOD LIST</b>	Generated when <b>ATI;COMD</b> is entered with options <b>PRINT</b> and <b>MOD FILE</b> .	None required	Contents of <b>ATI;FMMOD</b> , <b>ATI;SVMOD</b> , <b>ATI;TBMOD</b> , <b>ATI;DPMOD</b> , and all SRIs.
<b>ATI;8214 REPORT ACCURACY TABLE</b>	Generates when <b>ATI;COMD</b> is entered with options <b>PRINT</b> and <b>ACCURACY TABLE</b> .	None required	Table for each of the 20 target acquisition agencies with their assumed accuracy in meters and azimuth in mils when locating each of the 20 target types.

Figure D-5 (continued). ATI Report Processing

<b>REPORT NAME</b>	<b>OUTPUT WHEN</b>	<b>DPMOD ENTRY</b>	<b>DATA PROVIDED IN REPORT</b>
<b>ATI;8215 RANGE ERROR TABLE</b>	Generates when ATI;COMD is entered with options PRINT and RG ERROR TABLE.	None required	Table for each of the 4 human target acquisition agencies with assumed accuracy in estimating distance.

**Figure D-5 (continued). ATI Report Processing****(reverse blank)**

## Appendix E

### Message Distribution

The figures in this appendix display the MCFSS flow of messages in graphical and tabular form to support the data requirements of all stations. The figures presented here support the **MOI**, **DEFAULT DESTINATION**, and **ATI;SRI** setup described in chapter 2. Each graphical figure is associated with the tabular figure immediately following it. The message flow displayed in figure E-1 is described by steps in the tabular figure E-2, the message flow displayed in figure E-3 is described by steps in the tabular figure E-4, etc. The numbered and lettered steps in associated figures correspond.

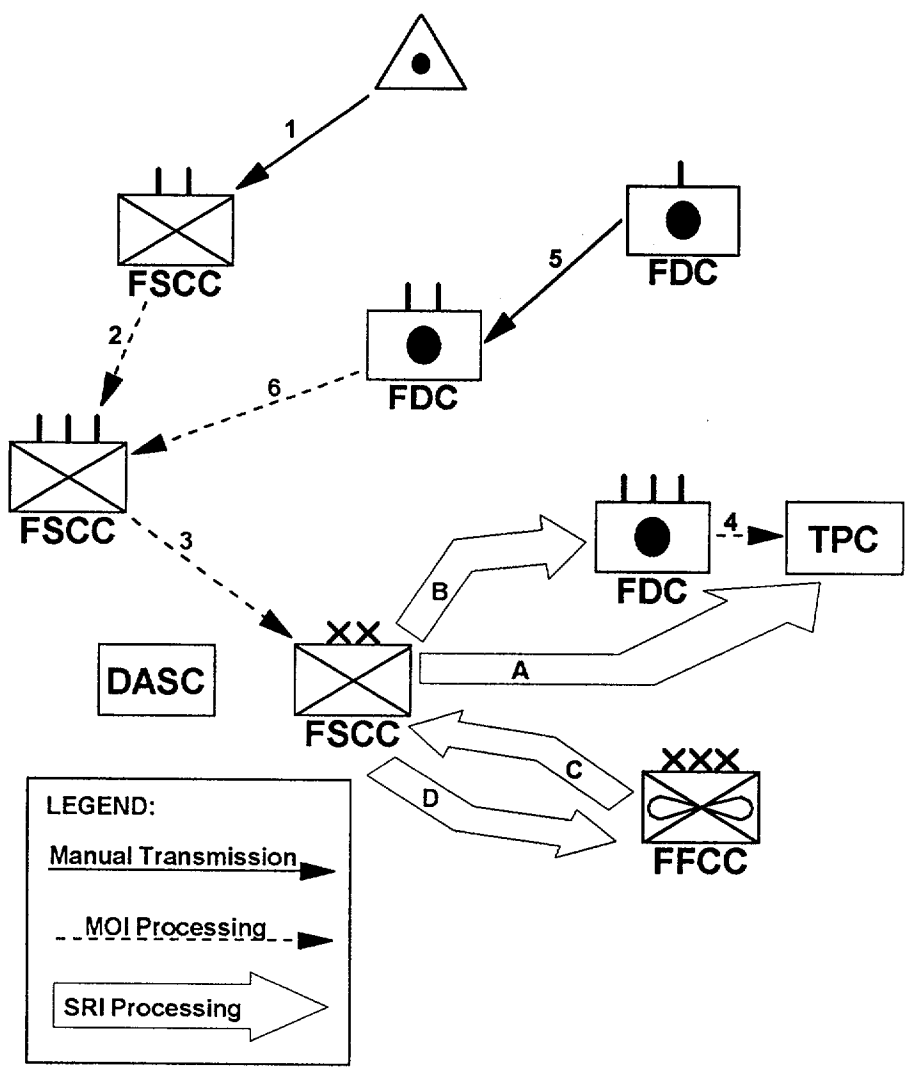


Figure E-1. ATI Message Exchange Flow

STEP	REMARKS
1. FO transmits ATI report.	Message is manually composed and transmitted.
2. Battalion FSCC passes ATI report to regimental FSCC.	Message prints but does not display. Battalion FSCC is setup in <b>ATI MODE 1</b> with an MOI established for <b>ATI;CDRs</b> , <b>ATI;SHRs</b> , and <b>ATI;AZRs</b> for regimental FSCC.
3. Regimental FSCC passes message to division FSCC.	Message prints but does not display. Regimental FSCC automatically retransmits message to division FSCC by MOI established for all <b>ATI</b> target messages.
4. Regimental FDC passes ATI messages to TPC.	Regimental FDC passes all <b>ATI</b> reports to TPC via MOI processing.
5. Battery FDC transmits ATI reports to battalion FDC.	Battery FDC manually transmits any composed or received <b>ATI</b> reports to battalion FDC.
6. Battalion FDC passes ATI reports to supported regimental FSCC.	Battalion FDC transmits any <b>ATI</b> reports received or transmitted via MOI processing to regimental FSCC.

A. TPC had already established SRIs at division FSCC.	TPC receives counterfire targets from division FSCC via level 3 SRIs established there. The 3 SRIs transmit all <b>RKTMSL</b> , <b>ARTY</b> , and <b>MORT</b> targets from division FSCC as they are received.
B. Regimental FDC had already established SRIs at division FSCC.	Regimental FDC receives counterfire targets from division FSCC via level 3 SRIs established there to complete TPC counterfire file. The 3 SRIs transmit all <b>SUPPLY/AMMO</b> , <b>EQUIP/RADAR</b> , and <b>PERS/OP</b> targets from division FSCC as they are received. Targets are retransmitted to TPC via MOI processing. (See step 5.)
C. Division FSCC had already established SRIs at MEF FFCC.	MEF FFCC establishes SRI at division FSCC to receive all targets beyond the FSCL.
D. MEF FFCC had already established SRIs at division FSCC.	Division FSCC establishes SRI at MEF FFCC to receive all targets short of the FSCL.

Figure E-2. ATI Message Exchange Steps

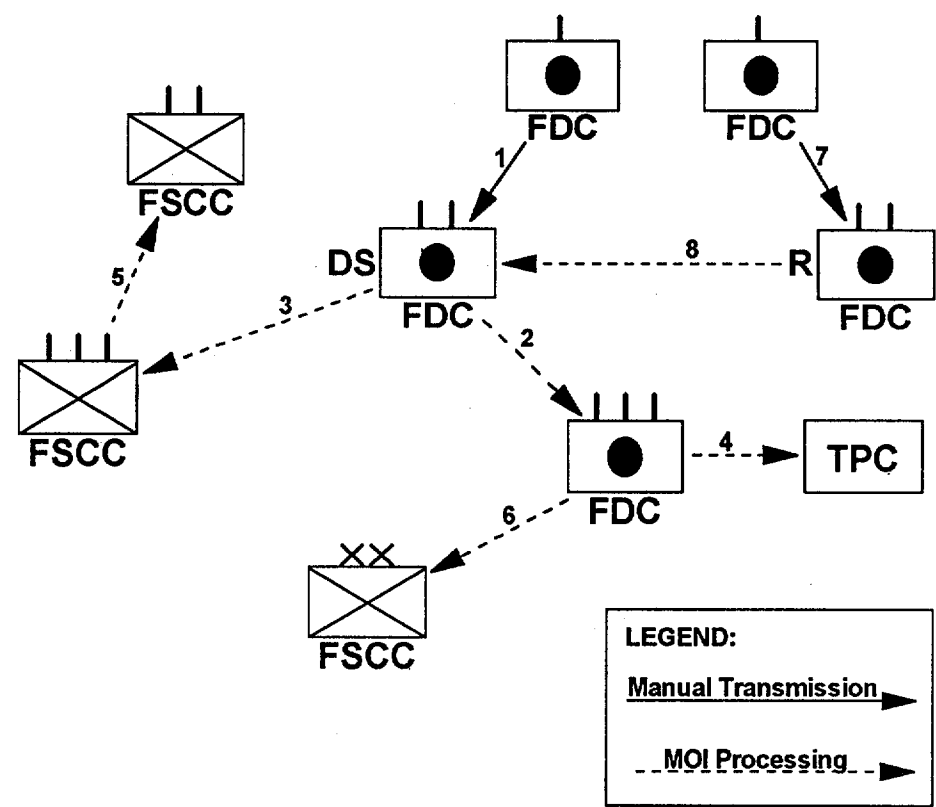


Figure E-3. AFU;UPDATE and AFU;AMMO Message Exchange Flow

STEP	REMARKS
1. Battery FDC transmits AFU;UPDATE and AFU;AMMO.	Message is manually composed and transmitted to the DS or GS battalion FDC.
2. Battalion FDC passes AFU;UPDATE and AFU;AMMO messages to regimental FDC.	AFU messages are automatically transmitted to battalion FDC's default subscriber — regimental FDC.
3. Battalion FDC passes AFU;UPDATEs and AMMOs to supported regimental FSCC.	This is accomplished by establishing an MOI for regimental FSCC for all incoming AFU;UPDATEs and AFU;AMMOs.
4. Regimental FDC passes messages to TPC.	Regimental FDC passes messages via MOI processing.
5. Regimental FSCC passes messages to subordinate battalion FSCCs.	Regimental FSCC passes messages via MOI processing using action and direction codes I/A.
6. Regimental FDC passes AFU;UPDATEs and AFU;AMMO messages to division FSCC.	Messages are transmitted automatically via MOI processing. Message prints but does not display because of PCLD alterations.
7. Battery FDCs of the R battalion transmit AFU;UPDATEs and AFU;AMMOs to the R battalion FDC.	Battery FDCs manually transmit messages.
8. R battalion FDC passes AFU;UPDATEs and AMMOs to the supported DS battalion FDC.	<p>These messages are transmitted via default subscriber to supported DS battalion FDC by default subscriber processing at the R battalion FDC. (DS battalion FDC is the default subscriber.)</p> <p><b>NOTE:</b> Version 10 BCS software will automatically generate AFU;AMMO:E at the end of each fire mission. These are processed through the system to maintain up-to-date ammunition count.</p>

Figure E-4. AFU;UPDATE and AFU;AMMO Message Exchange Steps

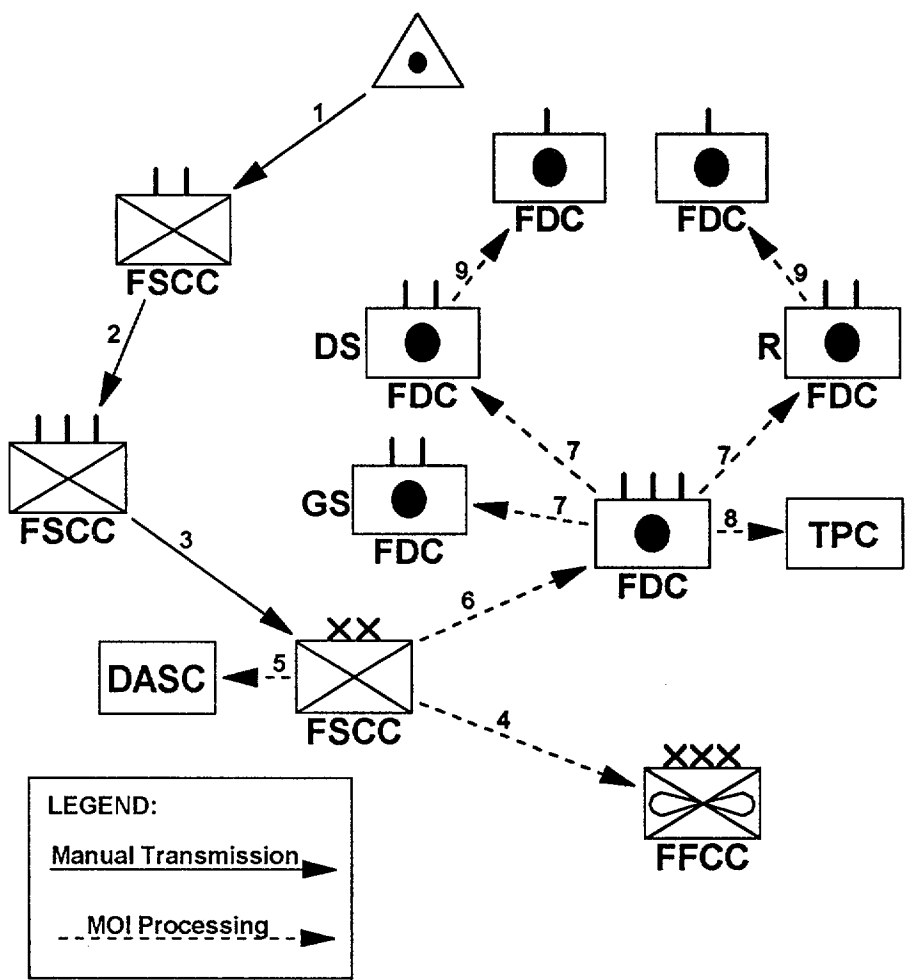


Figure E-5. SPRT;BGEOM and SPRT;ZONE Message Exchange Flow

STEP	REMARKS
1. FO transmits <b>FLOT</b> message to battalion FSCC.	Message is manually composed and transmitted to battalion FSCC.
2. Battalion FSCC passes <b>SPRT</b> messages to regimental FSCC.	Battalion FSCC checks and corrects <b>FLOT</b> messages received from FOs. These messages are received as errors. Battalion FSCC must enter plan name and <b>FSCoord</b> fields as well as check the points. <b>FLOT</b> , as well as other <b>SPRT;BGEOM</b> and <b>SPRT;ZONE</b> messages, are transmitted manually to regimental FSCC.
3. Regimental FSCC passes <b>SPRT</b> messages to division FSCC.	Regimental FSCC passes messages by manually transmitting any support message received from a lower echelon station.
4. Division FSCC passes messages to MEF FFCC.	Division FSCC passes messages via MOI processing.
5. Division FSCC passes messages to DASC.	Messages are transmitted automatically via MOI processing.
6. Division FSCC passes messages to regimental FDC.	Division FSCC automatically passes messages via MOI processing. Message prints but does not display at regimental FDC because of PCLD alterations.
7. Regimental FDC passes <b>SPRT</b> messages to all battalion FDCs.	<b>SPRT;BGEOMs</b> and <b>ZONEs</b> are transmitted to all battalion FDCs without regard to their missions. This facilitates changes in missions by requiring no change to these MOIs. Received messages print but do not display due to PCLD alterations.
8. Regimental FDC passes message to TPC.	Regimental FDC automatically passes messages via MOI processing. Message prints but does not display at TPC because of PCLD alterations.
9. Battalion FDC passes <b>SPRT</b> messages to subordinate battery FDCs.	Battalion FDC automatically passes messages via MOI processing. BCS can only store 1 <b>ZONE</b> , 1 <b>FLOT</b> , and 8 circular RFAs. All others must be printed and plotted manually.

**Figure E-6. SPRT;BGEOM and SPRT;ZONE Message Exchange Steps**

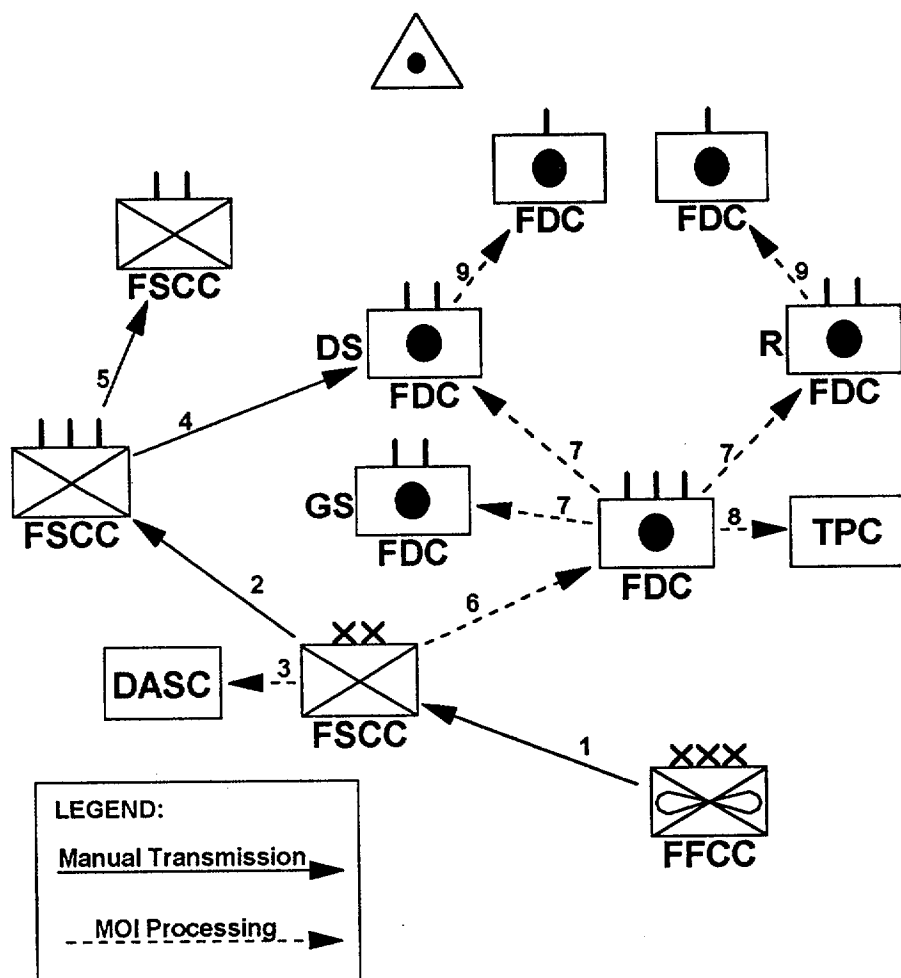


Figure E-7. SPRT;BGEOM and SPRT;ZONE Message Exchange Flow From Higher Echelon

**NOTE:** SPRT messages input at division FSCC or MEF FFCC are manually transmitted to the next lower level. Division uses a multisubscriber group to transmit to regiments. SPRT messages received from these stations or input by regimental FSCC must be manually transmitted to disseminate them to subordinate battalion FSCCs. Regimental FSCC uses a multisubscriber group to transmit to battalions.

STEP	REMARKS
1. MEF FFCC manually transmits <b>SPRT;BGEOM</b> and <b>SPRT;ZONE</b> to division FSCC.	Message is manually composed and transmitted.
2. Division FSCC transmits <b>SPRT</b> messages to regimental FSCC.	Division FSCC transmits to a multisubscriber group <b>R/E/G/TS/___</b> . This group is composed of all subordinate regimental FSCCs.
3. Division FSCC passes message to DASC.	Message is automatically transmitted via MOI established for DASC with code <b>I/A</b> for <b>SPRT;BGEOM</b> and <b>SPRT;ZONE</b> .
4. Regimental FSCC manually transmits <b>SPRT</b> messages to battalion FDC.	Regimental FSCC passes messages via MOI processing. Message prints but does not display at battalion FDC because of PCLD alterations.
5. Regimental FSCC passes messages to battalion FSCC.	Regimental FSCC passes messages manually to multisubscriber group of all battalion FSCCs — <b>B/N/F/SC/CS</b> .
6. Division FSCC passes <b>SPRT</b> data to regimental FDC.	Messages are transmitted automatically via MOI processing. Message prints at regimental FDC but does not display due to PCLD alterations.
7. Regimental FDC passes <b>SPRT</b> messages to subordinate battalion FDCs.	Regimental FDC automatically passes the messages via MOI processing to all battalion FDCs without regard to mission. Message prints but does not display at battalion FDC because of PCLD alterations.
8. Regimental FDC passes <b>SPRT</b> messages to TPC.	Regimental FDC automatically passes messages via MOI processing. Message prints but does not display at TPC because of PCLD alterations.
9. Battalion FDC passes <b>SPRT</b> messages to battery FDCs.	Battalion FDC automatically passes messages via MOI processing.

Figure E-8. **SPRT;BGEOM** and **SPRT;ZONE** Message Exchange Steps From Higher Echelon

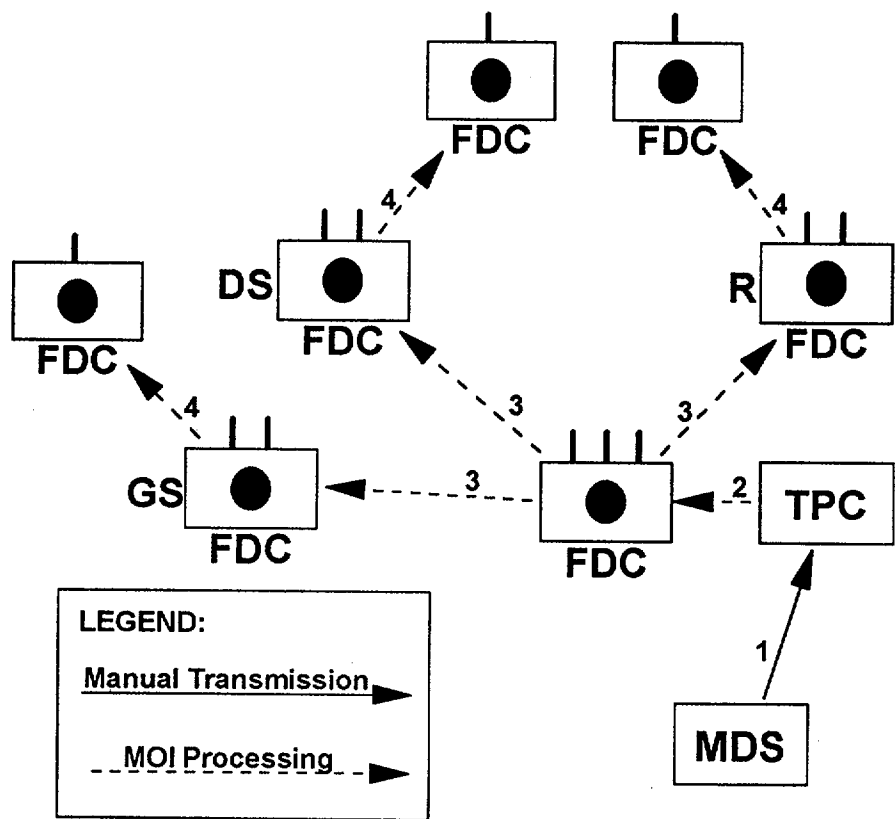


Figure E-9. MET;CM Message Exchange Flow

STEP	REMARKS
1. MDS transmits MET;CM message to TPC.	At TPC, the message is received and stored automatically without display because of PCLD alterations.
2. TPC passes MET;CM to the regimental FDC.	MET;CM is passed to regimental FDC automatically via MOI processing. At regimental FDC, message is received and stored automatically without display because of PCLD alterations.
3. Regimental FDC passes MET;CM messages to battalion FDC.	Regimental FDC passes the messages via MOI processing.
4. Battalion FDC passes MET;CM to battery FDCs.	Battalion FDC is the first station at which MET;CM displays on the screen for review. MET;CM is actioned and automatically transmitted to battery FDCs.

Figure E-10. MET;CM Message Exchange Steps

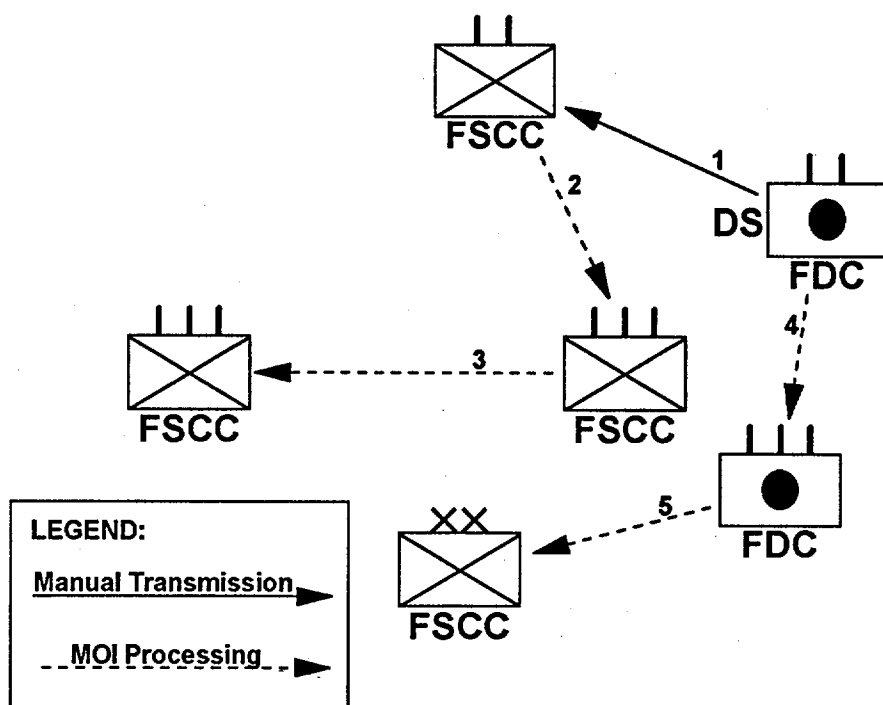


Figure E-11. AFU;MFR Message Exchange Flow

STEP	REMARKS
1. Battalion FDC passes AFU;MFR to battalion FSCC.	AFU;MFR is generated at battalion FDC at end of mission. Message is actioned and automatically transmitted to the battalion FSCC via MOI processing.
2. Battalion FSCC passes AFU;MFR to regimental FSCC.	AFU;MFR is received from battalion FDC and actioned. Message is automatically transmitted to regimental FSCC via MOI processing using codes I/A.
3. Regimental FSCC passes AFU;MFR to adjacent regimental FSCCs.	Regimental FSCC passes messages via MOI processing. MOI is established with action code B and adjacent regimental zone associated.
4. Battalion FDC passes AFU;MFR to regimental FDC.	AFU;MFR is transmitted automatically via default subscriber processing.
5. Regimental FDC passes AFU;MFR to division FSCC.	Message is automatically transmitted via MOI processing with codes I/A.

Figure E-12. AFU;MFR Message Exchange Steps

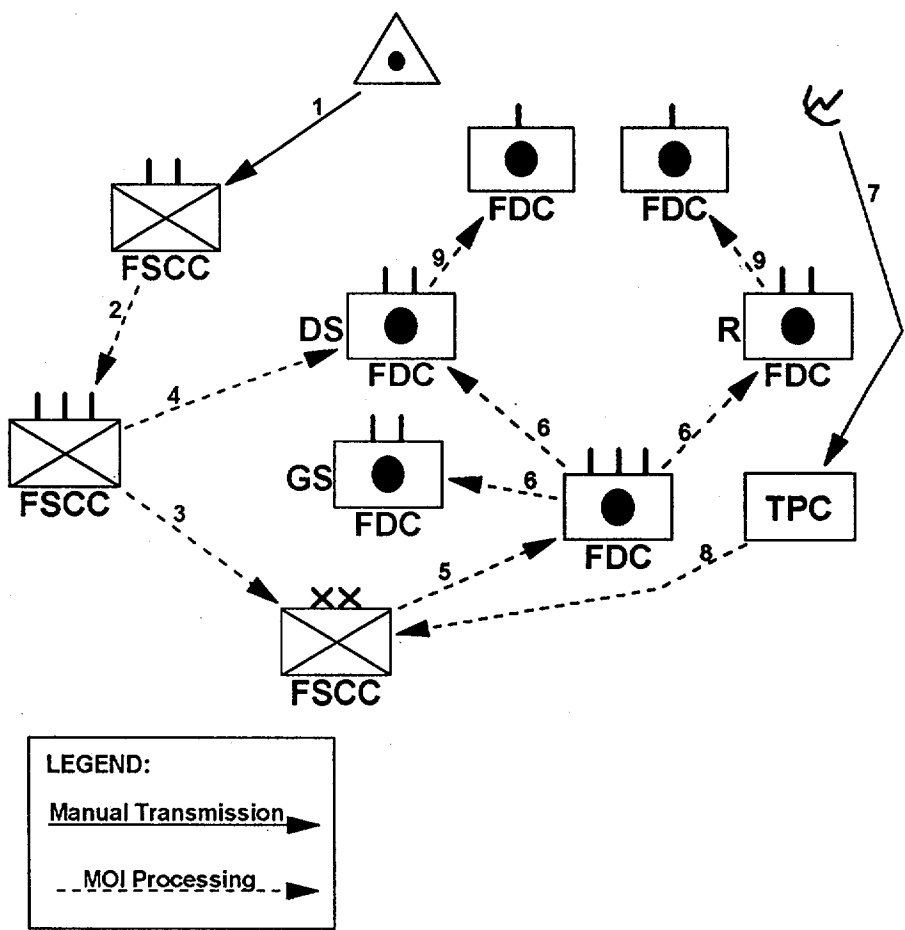


Figure E-13. FM;OBCO Message Exchange Flow

STEP	REMARKS
1. Observer passes <b>OBSERVER LOCATION</b> message to battalion FSCC.	Message is manually transmitted by observer.
2. Battalion FSCC passes <b>FM;OBCO</b> to regimental FSCC.	<b>FM;OBCO</b> is transmitted to regimental FSCC via MOI processing.
3. Regimental FSCC passes <b>FM;OBCO</b> to division FSCC.	This is accomplished automatically via MOI processing using codes <b>I/A</b> .
4. Battalion FSCC passes <b>FM;OBCO</b> to DS battalion FDC.	Message is transmitted via MOI processing. This step is included, despite the fact that the message will also be transmitted down from regimental FDC, to provide timely processing of observer's location at battalion FDC.
5. Division FSCC passes <b>FM;OBCO</b> to regimental FDC.	Message is transmitted via MOI processing using codes <b>I/A</b> .
6. Regimental FDC passes <b>FM;OBCO</b> to all subordinate battalion FDCs.	Message is transmitted via MOI processing using codes <b>I/A</b> . This step shows message being received a second time by the FDC supporting the FO.
7. <b>RADAR</b> locations are passed from the radar to TPC.	Message is manually composed and transmitted.
8. TPC passes <b>FM;OBCO</b> to division FSCC.	Message is transmitted via MOI processing by relay through regimental FDC to provide warning of radar use in the area of operations.
9. Battalion FDCs pass <b>FM;OBCOs</b> to subordinate battery FDCs.	Messages are passed via MOI processing.

Figure E-14. FM;OBCO Message Exchange Steps

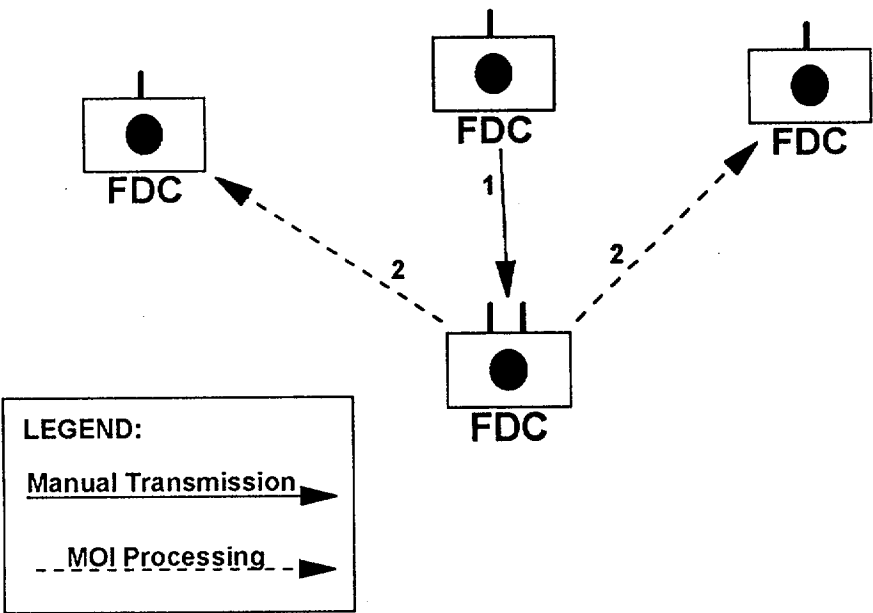


Figure E-15. AFU;REG Message Exchange Flow

STEP	REMARKS
1. Registered battery passes AFU;REG to battalion FDC.	Message is manually transmitted. At battalion FDC, AFU;REG is examined and actioned.
2. Battalion FDC passes AFU;REG to subordinate battery FDCs.	Message is passed via MOI processing.

Figure E-16. AFU;REG Message Exchange Steps

## Appendix F

### Combining Weight Tables

The Combining Weight Tables in this appendix reflect, by weighting value, each of the 20 target acquisition agencies' ability to report each element of the target description. A table exists for each of the following elements: type, subtype, DOP, and strength. Combined weight values are used in target comparison and combination. A larger value weighs toward a favorable comparison or combination. These weighting values cannot be changed by the operator.

AGENCY ACQUIRING TARGET	PERS TARGET							WPN TARGET							MORT TARGET						
	NOT GIVEN	UNK	INF	OP	PTL	WKPTY	POS	NOT GIVEN	UNK	LTMG	ATG	HVMG	RCLR	POS	NOT GIVEN	UNK	LT	MDM	HV	VH	POS
FO	80	60	75	64	68	69	70	67	38	40	42	46	42	39	60	48	50	52	52	52	49
TGTB	7	59	73	67	69	70	72	70	39	40	43	48	43	39	66	54	57	58	58	58	55
AOBSR	81	71	78	76	73	73	72	70	39	41	43	49	43	40	69	56	58	59	63	64	57
SORNG	0	3	9	6	7	8	4	46	30	32	39	39	35	31	57	42	44	47	50	55	43
FLRNG	21	16	22	16	21	13	17	53	2	3	39	5	3	3	55	37	41	41	45	47	38
CMRR	6	3	6	5	6	5	4	6	2	4	6	5	3	3	79	57	59	63	68	70	58
CBRR	28	8	22	10	21	19	9	6	2	3	6	5	4	2	67	54	56	58	61	63	55
FOWOL	64	54	63	55	60	63	55	63	44	46	64	53	51	45	56	41	43	43	43	47	42
PI	50	42	47	41	44	45	43	53	41	42	42	42	42	42	53	39	45	46	48	49	50
POW	49	41	48	39	44	36	42	24	15	16	16	16	16	16	42	33	39	39	40	41	35
GSRA	63	33	56	27	53	49	34	26	15	16	16	16	16	16	25	16	22	22	23	24	17
SLAR	49	29	38	30	35	37	30	47	34	35	35	35	35	35	47	33	35	37	38	40	34
IR	54	36	44	37	41	43	37	53	43	44	44	44	44	44	57	44	46	46	46	46	45
TACAIR	44	16	35	17	26	31	17	30	19	20	20	20	20	20	29	17	19	21	22	24	18
OBSR	64	54	63	55	60	63	55	63	44	46	54	53	51	45	56	41	43	43	43	47	42
COMINT	40	20	32	36	21	22	21	19	15	16	16	16	16	16	29	22	23	23	23	23	23
ELINT	32	14	25	26	20	15	15	30	16	17	17	17	17	17	23	17	18	18	18	18	18
LRRP	70	51	58	58	57	58	62	60	39	41	44	45	41	40	67	56	57	58	58	59	58
RPV	81	71	81	71	78	76	73	70	39	41	43	49	43	40	69	56	58	59	63	64	57
JSTARS	64	54	64	55	60	63	55	63	44	46	64	53	51	45	56	41	43	43	43	47	42

AGENCY ACQUIRING TARGET	ARTY TARGET							ARMOR TARGET							VEH TARGET							
	NOT GIVEN	UNK	LT	MDM	HV	VH	POS	NOT GIVEN	UNK	LT	MDM	HV (1)	APC (2)	POS	NOT GIVEN	UNK	LTWHL	HVWHL (3)	RECON	BT	ACFT	HEL
FO	61	42	54	54	58	44	44	80	71	72	72	74	72	71	75	58	69	77	70	65	73	73
TGTB	67	50	65	63	62	51	51	76	69	70	70	72	70	70	73	58	69	73	69	61	63	63
AOBSR	80	71	72	73	75	76	72	85	76	78	78	80	78	76	83	66	76	80	78	78	81	80
SORNG	76	5	61	63	64	61	60	31	18	21	27	26	19	18	14	12	12	13	11	9	11	11
FLRNG	70	53	55	57	58	59	55	52	36	41	49	47	37	36	40	7	36	37	35	6	40	37
CMRR	62	45	51	52	53	53	52	16	11	9	15	15	9	11	8	7	5	6	5	8	10	9
CBRR	72	60	62	63	64	65	61	38	28	30	33	35	30	29	34	9	27	33	27	12	28	27
FOWOL	58	41	46	45	43	--	42	71	58	60	61	62	60	59	69	50	58	62	57	51	59	58
PI	68	52	58	61	63	64	57	67	55	57	59	62	60	58	64	35	57	60	58	36	56	55
POW	47	43	44	44	44	44	44	42	36	37	39	40	37	37	39	27	36	36	36	36	36	35
GSRA	29	24	26	27	27	28	25	72	60	62	68	67	64	61	70	26	68	74	70	66	44	27
SLAR	58	44	46	47	48	49	45	74	57	59	61	63	60	58	71	45	58	61	57	56	47	46
IR	63	48	50	51	52	53	49	77	60	62	65	68	63	61	74	42	61	63	60	59	44	43
TACAIR	51	39	41	43	46	50	40	60	39	46	52	57	44	40	62	40	48	53	47	41	61	60
OBSR	58	41	46	45	43	43	42	71	58	60	61	62	60	59	69	50	58	62	57	51	59	58
COMINT	37	28	29	29	29	29	29	37	25	28	28	28	27	26	32	17	19	19	23	18	25	25
ELINT	29	21	22	22	22	22	22	29	18	22	22	22	20	19	24	9	12	12	16	10	23	23
LRRP	68	42	56	58	58	59	52	72	62	64	65	67	64	63	72	60	64	65	63	62	63	65
RPV	80	71	72	73	75	76	72	85	76	78	78	80	78	76	83	86	76	80	78	78	81	80
JSTARS	58	41	46	45	43	--	42	71	58	60	61	62	60	59	69	50	58	62	57	51	59	58

NOTES: (1) ARMOR/HV values also apply to target type/subtypes:

FORM/AGBTKB, FORM/TNKBNM, FORM/TNKBNS,  
ASSY/TNKBNT, and ASSY/TNKBNA.

(2) ARMOR/APC values also apply to target type/subtypes:

FORM/AGBBTR, FORM/AGBBMP, FORM/MRBMNR,  
FORM/MRBBNP, FORM/MRBSPP, FORM/MRBSPP,  
ASSY/TACBTR, ASSY/ADMBTR, ASSY/ADMBTR,  
ASSY/ADMBMP, and ASSY/TACBMP.

(3) VEH/HVWHL values also apply to target type/subtypes:

ASSY/SPRTEL.

AGENCY ACQUIRING TARGET	RKTMSL TARGET								SUPPLY TARGET						
	NOT GIVEN	UNK	APERS	LTMSL	MDMSL	VHMSL	ATANK	POS	NOT GIVEN	UNK	AMMO	PTL	BRGEQ	CLI	CLII
FO	53	33	44	44	44	36	36	46	62	51	52	52	52	52	52
TGTB	59	34	50	50	50	45	37	52	62	50	51	51	51	51	51
AOBSR	64	53	56	56	62	65	56	58	81	63	64	64	64	64	64
SORNG	31	17	23	24	26	26	21	21	3	3	3	3	3	3	3
FLRNG	53	34	42	43	46	48	41	48	14	8	9	9	9	9	9
CMRR	32	18	23	25	27	29	31	38	2	2	2	2	2	2	2
CBRR	43	37	31	32	34	36	29	44	6	3	3	3	3	3	4
FOWOL	31	34	41	40	40	36	35	45	49	39	40	40	40	40	40
PI	61	39	41	54	56	55	40	40	77	64	65	68	65	65	65
POW	40	31	34	34	35	36	32	32	50	41	42	42	42	42	42
GSRA	23	17	20	20	21	22	18	18	15	9	10	10	10	10	10
SLAR	58	38	41	40	46	51	39	40	60	48	49	49	49	49	49
IR	60	41	44	43	47	53	52	45	47	36	37	37	37	37	37
TACAIR	56	35	38	37	47	55	36	39	68	56	57	57	57	57	57
OBSR	51	34	41	40	40	36	35	45	49	39	40	40	40	40	40
COMINT	31	19	20	24	24	24	24	24	28	21	22	22	22	22	22
ELINT	32	17	18	25	25	25	25	25	22	17	18	18	18	18	18
LRRP	68	58	58	54	58	64	53	54	80	67	69	69	69	69	69
RPV	64	53	56	56	62	65	56	58	81	63	64	64	64	64	64
JSTARS	31	34	41	40	40	36	35	45	49	39	40	40	40	40	40

AGENCY ACQUIRING TARGET	CENTER TARGET							EQUIP TARGET						
	NOT GIVEN	UNK	SMALL	BN	REGT	DIV	FWD	NOT GIVEN	UNK	RADAR	EW	SLT	GDNC	LS
FO	63	52	60	58	55	53	62	60	47	48	48	48	48	48
TGTB	62	51	59	58	55	53	61	62	49	50	50	50	50	50
AOBSR	77	61	62	66	68	70	72	69	54	55	55	55	55	55
SORNG	3	1	3	2	1	1	1	2	1	1	1	1	1	1
FLRNG	17	3	9	7	4	4	4	13	7	8	8	8	8	8
CMRR	4	1	3	2	1	1	1	2	1	1	1	1	1	1
CBRR	9	6	7	7	6	6	6	3	1	2	1	1	1	1
FOWOL	48	36	42	40	39	37	46	50	40	41	41	41	41	41
PI	65	48	49	53	55	57	59	53	40	41	41	41	41	41
POW	48	39	40	40	40	40	40	25	17	18	18	18	18	18
GSRA	21	12	13	14	15	17	16	1	1	1	1	1	1	1
SLAR	57	45	49	53	55	57	46	56	43	44	44	44	44	44
IR	44	29	30	34	36	38	32	40	31	32	32	39	32	32
TACAIR	62	43	46	51	52	53	44	51	41	42	42	42	42	42
OBSR	48	36	42	40	39	37	46	50	40	41	41	41	41	41
COMINT	44	36	37	37	37	37	37	19	7	19	19	4	18	8
ELINT	40	31	32	32	32	32	32	21	4	21	20	5	19	5
LRRP	62	51	52	52	52	52	52	51	41	42	42	42	42	42
RPV	77	61	62	66	68	70	72	69	54	55	55	55	55	55
JSTARS	48	36	42	40	39	37	46	50	40	41	41	41	41	41

AGENCY ACQUIRING TARGET	BLDG TARGET							BRIDGE TARGET									
	NOT GIVEN	UNK	WOOD	MASNRY	CONC	MET	SPCL	NOT GIVEN	UNK	FTPON	VEHPON	CONC	WOOD	STEEL	SITE	RAFT	FERRY
FO	80	63	64	64	64	65	64	61	65	62	65	66	66	67	61	60	63
TGTB	78	62	63	63	63	64	63	48	56	61	64	65	65	66	60	57	59
AOBSR	89	70	72	72	72	73	71	91	62	67	70	73	74	75	65	63	66
SORNG	3	1	2	2	2	2	2	4	1	3	3	2	2	2	2	3	2
FLRNG	18	13	14	14	14	14	14	17	12	14	14	13	13	13	13	13	13
CMRR	3	1	2	2	2	2	2	3	1	2	2	1	1	1	1	2	2
CBRR	5	2	3	3	3	3	3	4	1	3	3	2	2	2	2	3	3
FOWOL	70	57	59	59	59	58	58	75	58	62	63	64	64	65	60	59	62
PI	84	60	65	63	62	64	61	62	67	70	70	71	71	71	66	65	68
POW	50	40	41	41	41	41	41	54	46	47	47	47	47	47	47	47	47
GSRA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SLAR	72	47	48	48	48	54	46	72	48	49	49	49	49	49	49	49	49
IR	47	32	33	33	33	34	33	44	23	26	29	30	30	32	25	24	27
TACAIR	73	64	65	65	65	65	65	75	57	58	58	58	58	59	58	58	58
OBSR	70	57	59	59	59	58	58	76	58	62	63	64	64	65	60	59	62
COMINT	9	5	6	6	6	6	6	7	3	4	4	4	4	4	4	4	4
ELINT	8	5	6	6	6	6	6	6	3	4	4	4	4	4	4	4	4
LRRP	77	67	69	65	65	68	68	76	65	66	66	66	66	66	66	66	66
RPV	89	70	72	72	72	73	71	91	62	67	70	73	74	75	65	63	66
JSTARS	70	57	59	59	59	58	58	75	58	62	63	64	64	65	60	59	62

AGENCY ACQUIRING TARGET	TERR TARGET								ASSY TARGET						ADA TARGET						
	NOT GIVEN	UNK	ROAD	JCT	HILL	DEFIL	LDGSTR	RR	NOT GIVEN	UNK	TRP	TRPVEH	TRPMECH	TRPARM	NOT GIVEN	UNK	LT	MDM	HV	MSL	POS
FO	82	68	69	69	69	69	69	69	63	49	50	53	53	53	53	36	36	40	42	34	33
TGTB	70	65	66	66	66	66	66	66	62	48	49	52	51	54	54	35	40	43	44	37	36
AOBSR	83	70	71	71	71	71	71	71	75	66	67	69	68	71	74	53	60	62	65	55	54
SORNG	3	1	2	2	1	1	1	2	4	1	2	3	3	3	73	56	58	61	63	39	57
FLRNG	18	2	14	14	13	12	12	14	15	12	13	13	13	13	13	42	15	31	38	40	30
CMRR	3	1	2	2	1	1	1	2	4	1	2	3	3	3	61	44	50	51	52	52	51
CBRR	5	1	3	3	1	1	1	3	13	10	11	11	11	11	72	59	61	62	63	64	60
FOWOL	72	61	62	62	62	62	62	62	57	45	46	48	47	49	47	30	31	34	37	40	32
PI	79	70	71	71	71	71	71	71	63	50	51	56	55	57	53	31	45	46	47	49	48
POW	47	39	40	40	40	40	40	40	46	39	41	41	41	41	42	33	34	34	34	34	34
GSRA	1	1	1	1	1	1	1	1	30	24	25	29	27	28	1	1	1	1	1	1	1
SLAR	59	47	48	48	48	48	48	48	57	44	45	51	49	53	58	42	43	46	45	46	44
IR	31	26	27	27	27	27	27	27	51	39	40	46	45	48	57	39	41	44	46	47	40
TACAIR	69	58	59	59	59	59	59	59	58	39	40	48	47	49	68	49	52	58	60	62	50
OBSR	72	61	62	62	62	62	62	62	57	45	46	48	47	49	47	30	31	34	37	40	32
COMINT	6	3	4	4	4	4	4	4	37	27	28	28	28	28	33	22	24	25	26	26	23
ELINT	5	3	4	4	4	4	4	4	28	21	22	22	22	22	42	30	34	35	36	40	34
LRRP	69	58	59	59	59	59	59	59	63	51	52	55	54	57	52	30	45	48	49	49	48
RPV	83	70	71	71	71	71	71	71	75	66	67	69	68	71	74	53	60	62	65	55	54
JSTARS	72	61	62	62	62	62	62	62	57	45	46	48	47	49	47	30	31	34	37	40	32

AGENCY ACQUIRING TARGET	DOP						SIZE		STR	
	COVER	DUGIN	PROVER	PRONE	PRUG	PRAUD	KNOWN	UNK	KNOWN	UNK
FO	77	64	55	50	52	49	77	10	75	10
TGTB	73	63	53	49	51	49	76	10	71	10
AOBSR	77	66	60	43	56	50	84	10	81	10
SORNG	6	4	4	4	5	4	23	10	26	10
FLRNG	21	18	14	12	14	12	38	10	33	10
CMRR	5	5	6	5	4	4	27	10	23	10
CBRR	7	4	6	6	6	4	27	10	24	10
FOWOL	76	63	51	54	48	49	75	10	75	10
PI	51	49	49	39	42	38	74	10	68	10
POW	29	28	32	33	30	31	49	10	47	10
GSRA	32	14	10	10	11	11	41	10	39	10
SLAR	25	21	21	20	20	22	52	10	43	10
IR	27	24	20	18	19	18	49	10	44	10
TACAIR	41	39	39	34	37	35	55	10	48	10
OBSR	71	63	54	49	51	48	75	10	69	10
COMINT	1	1	1	1	1	1	26	10	22	10
ELINT	1	1	1	1	1	1	23	10	22	10
LRRP	70	62	53	48	50	47	74	10	68	10
RPV	77	66	60	43	56	50	84	10	81	10
JSTARS	76	63	51	54	48	49	75	10	75	10

(reverse blank)

## Appendix G

### Separation Distance Tables

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	400	400	400

INDEX

RPF=50

4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	7	11	13	14	15	16	17	18	18	19	20	20	21	22	22	22	22	22	22	22	22	23	23	23
3.0	14	23	27	29	31	33	34	36	37	38	40	41	42	43	44	44	44	44	45	45	45	46	46	47
2.5	20	35	40	43	47	50	51	54	56	57	60	62	64	65	66	66	66	67	67	68	68	70	70	70
2.0	20	45	54	58	62	66	68	72	75	76	80	83	85	87	88	88	89	89	90	90	91	93	93	94
1.5	20	45	60	70	78	83	85	91	93	95	100	104	107	109	110	111	111	112	112	113	114	116	117	117
1.0	20	45	60	70	85	100	103	109	112	114	120	125	128	131	132	133	133	134	135	136	137	140	140	141
0.5	20	45	60	70	85	100	110	127	131	133	140	145	150	153	154	155	155	156	157	159	160	163	164	164
0.0	20	45	60	70	85	100	110	135	150	152	160	166	171	175	177	177	178	179	180	181	183	186	187	188
-0.5	20	45	60	70	85	100	110	135	150	152	180	187	192	197	199	200	200	201	202	204	206	210	210	211
-1.0	20	45	60	70	85	100	110	135	150	160	200	208	214	219	221	222	222	224	225	227	228	233	234	235
-1.5	20	45	60	70	85	100	110	135	150	160	200	229	235	241	243	244	245	246	247	250	252	256	257	258
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	257	263	265	266	267	269	270	272	275	280	281	282
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	278	285	287	288	289	291	292	295	297	303	304	305
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	307	309	311	311	313	315	318	320	326	328	329
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	329	331	333	334	336	337	340	343	350	351	352
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	351	354	355	356	358	360	363	366	373	375	376

RPF=100

4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	8	15	18	20	22	25	26	28	30	30	33	35	37	39	39	40	40	40	40	41	42	43	44	44
3.0	16	31	37	41	45	50	52	57	60	61	66	71	75	78	79	80	80	81	81	83	84	87	88	88
2.5	20	45	56	61	68	75	78	86	90	92	100	107	112	117	119	120	120	121	122	125	126	131	132	133
2.0	20	45	60	70	85	100	110	114	120	123	133	142	150	156	158	160	160	162	163	166	169	175	176	177
1.5	20	45	60	70	85	100	110	135	150	153	166	178	187	195	198	200	201	203	204	208	211	218	220	222
1.0	20	45	60	70	85	100	110	135	150	160	200	214	225	234	238	280	241	243	245	250	253	262	264	266
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	313	277	320	281	284	286	291	296	306	308	311
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	352	317	360	321	325	327	333	338	350	352	355
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	357	400	361	365	368	159	380	393	397	400
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	401	406	409	416	423	437	441	444
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	458	465	481	485	488
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	507	525	529	533
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	568	573	577
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	612	617	622
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	656	661	666
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	705	711

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	350	400	400

INDEX

RPF=150

4.0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
3.5	8	17	21	23	27	30	31	35	37	38	42	46	50	52	54	54	54	55	56	57	59	61	62	63
3.0	17	34	42	47	54	60	63	71	75	77	85	93	100	105	107	109	109	111	112	115	117	123	125	126
2.5	20	45	60	70	81	90	95	106	112	116	128	140	150	158	161	163	164	167	168	173	176	185	187	189
2.0	20	45	60	70	85	100	110	135	150	154	171	187	200	211	215	218	219	223	225	230	235	247	250	252
1.5	20	45	60	70	85	100	110	135	150	160	200	234	250	264	269	272	274	278	281	288	294	308	312	315
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	317	323	327	329	334	337	346	353	370	375	379
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	377	381	384	390	393	403	412	432	437	442
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	461	471	494	500	505
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	530	556	562	568
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	617	625	631
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	679	687	694
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	758
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=200

4.0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	18	23	25	29	33	35	40	42	44	50	55	60	64	65	66	67	68	69	71	73	78	79	80
3.0	18	36	46	51	59	66	70	80	85	88	100	111	120	128	131	133	134	137	138	143	146	155	158	160
2.5	20	45	60	70	85	100	106	120	128	133	150	166	180	193	197	200	201	205	207	214	220	233	237	240
2.0	20	45	60	70	85	100	110	135	150	160	200	222	240	257	263	266	269	274	277	285	293	311	316	320
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	321	329	333	336	342	346	357	366	389	395	400
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	403	411	415	428	440	466	473	480
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	513	544	552	560
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	622	631	640
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	710	720
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

# **MCSS Techniques and Procedures**

**G-3**

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	400	400	400

INDEX

RPF=250

4.0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	19	24	27	31	35	38	43	46	48	55	62	68	74	76	77	77	79	80	83	86	92	94	95
3.0	18	38	48	54	63	71	76	87	93	97	111	125	136	147	151	154	155	159	161	167	172	184	187	190
2.5	20	45	60	70	85	100	110	131	140	146	166	187	204	221	227	231	233	238	241	250	258	276	281	286
2.0	20	45	60	70	85	100	110	135	140	160	200	250	272	295	303	307	310	317	321	333	344	368	375	381
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	379	384	388	397	402	417	430	460	469	476
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	515	553	562	571
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	645	656	667
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	762
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=300

4.0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	19	25	28	33	37	40	46	50	52	60	68	75	82	84	86	86	89	90	94	97	105	107	109
3.0	18	39	50	56	66	75	80	93	100	104	120	136	150	163	168	171	173	177	180	187	194	210	214	218
2.5	20	45	60	70	85	100	110	135	150	156	180	204	225	245	253	257	260	266	270	281	291	315	322	327
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	327	337	343	346	355	360	375	388	420	429	436
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	469	485	525	536	546
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	630	643	655
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	764
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	350	400	400

INDEX

RPF=350

4.0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	19	25	29	34	38	41	48	52	54	63	73	81	89	92	93	94	97	98	103	107	117	120	122
3.0	18	39	51	58	68	77	83	97	105	109	127	146	161	177	183	187	189	197	197	206	214	234	239	244
2.5	20	45	60	70	85	100	110	135	150	160	191	218	242	266	275	280	283	291	295	309	321	350	358	365
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	355	367	373	378	388	394	412	428	467	477	487
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	535	584	597	609
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	716	731
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=400

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	20	26	29	35	40	43	50	54	57	66	77	86	95	98	100	101	104	106	111	116	128	131	134
3.0	19	40	52	59	70	80	86	100	109	114	133	154	171	189	196	200	202	208	212	222	232	255	261	267
2.5	20	45	60	70	85	100	110	135	150	160	200	231	257	284	294	300	304	313	318	333	348	382	392	400
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	405	417	424	445	463	509	522	534
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	637	652	667
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

# MCFSS Techniques and Procedures

G-5

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400	
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	400	350	400	400

INDEX

RPF=450

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	20	26	29	35	40	44	51	56	59	69	80	90	100	104	106	107	111	113	119	124	137	141	144
3.0	19	40	52	60	71	81	88	103	112	118	138	161	180	200	208	212	215	221	225	237	248	274	282	288
2.5	20	45	60	70	85	100	110	135	150	160	200	241	270	300	311	318	322	332	338	355	371	411	422	432
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	474	495	548	563	576
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	685	704	720
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=500

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3.5	9	20	26	30	36	41	45	53	57	60	71	83	94	105	109	111	113	116	119	125	131	146	151	154
3.0	19	41	53	61	72	83	90	106	115	121	143	167	187	209	218	222	225	233	237	250	262	292	301	308
2.5	20	45	60	70	85	100	110	135	150	160	200	250	281	314	326	333	338	349	355	375	393	438	451	462
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	524	584	601	616
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	770
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	350	400	400

INDEX

RPF=550

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
3.5	9	20	27	31	36	42	45	54	59	62	73	86	97	109	113	116	118	122	124	131	138	155	159	164
3.0	19	41	54	62	73	84	91	108	117	124	146	172	194	218	227	232	235	243	248	262	275	309	318	327
2.5	20	45	60	70	85	100	110	135	150	160	200	250	291	326	340	348	353	365	371	393	413	463	477	490
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	617	635	652
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	770
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=600

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	
3.5	9	20	27	31	37	42	46	55	60	63	75	88	100	113	117	120	122	126	129	137	144	162	167	172
3.0	19	41	54	62	73	85	93	110	120	126	150	176	200	225	235	240	244	252	257	273	287	324	334	344
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	338	352	360	366	379	386	409	431	485	501	515
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	647	667	686
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	770
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

# MCFSS Techniques and Procedures

G-7

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	400	400	400

INDEX	RPF=650																							
4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
3.5	9	20	27	31	37	43	47	55	61	64	76	90	103	116	121	124	126	131	133	142	149	169	175	180
3.0	19	42	54	63	75	86	94	111	121	128	153	180	205	232	242	248	252	261	266	283	298	338	349	359
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	348	363	372	377	391	399	424	447	506	523	539
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	675	697	718
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	770
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

	RPF=700																							
4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
3.5	9	21	27	31	37	43	47	56	61	65	78	92	105	119	124	128	130	134	137	146	155	176	182	188
3.0	19	42	55	63	75	87	95	113	123	130	155	184	210	238	249	255	259	269	274	292	309	351	363	374
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	357	373	382	388	403	411	438	463	526	544	561
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	725	748
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	400	400	400

INDEX

RPF=750

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
3.5	9	21	27	32	38	44	47	57	62	66	79	94	107	122	127	131	133	138	141	151	159	182	188	194
3.0	19	42	55	64	76	88	95	114	125	132	158	187	214	243	255	261	265	276	282	301	318	363	376	388
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	382	392	398	413	422	451	477	544	563	582
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	775
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=800

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
3.5	9	21	27	32	38	44	48	57	63	66	80	95	109	124	130	134	136	141	144	154	164	188	194	201
3.0	19	42	55	64	76	88	95	115	126	133	160	190	218	249	260	267	271	282	288	308	327	374	388	401
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	382	400	407	423	432	462	490	561	582	601
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

# MCFSS Techniques and Procedures

G-9

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	150	350	350	350	400	400	400	400	400	350	400	400

INDEX

RPF=850

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	
3.5	9	21	28	32	38	44	48	58	63	67	81	97	111	127	133	136	139	144	148	158	168	193	200	207
3.0	19	42	56	64	77	89	97	116	127	134	162	193	222	253	265	272	277	288	295	315	335	385	399	413
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	432	442	473	502	577	599	619
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=900

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	
3.5	9	21	28	32	38	45	49	58	64	68	82	98	113	129	135	139	141	147	151	161	171	198	206	213
3.0	19	42	56	64	77	90	98	117	128	136	163	196	225	257	270	277	282	294	301	322	342	395	410	425
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	483	513	592	615	636
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RV1	10	10	10	35	35	50	10	35	50	10	50	100	150	10	35	50	10	35	50	100	150	350	350	400
RV2	10	35	50	35	50	50	100	100	100	150	150	150	350	350	350	400	400	400	400	400	400	350	400	400

INDEX RPF=950

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
3.5	9	21	28	32	39	45	49	59	64	68	82	99	114	131	137	141	144	150	153	164	175	203	211	218
3.0	19	42	56	65	78	90	98	118	129	137	165	198	228	261	274	282	287	299	306	328	349	404	420	435
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	492	523	606	630	653
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

RPF=999

4.0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
3.5	9	21	28	32	39	45	49	59	65	69	83	100	116	133	139	143	146	152	156	167	178	207	215	223
3.0	19	42	56	65	78	90	99	119	130	138	166	200	231	265	278	286	291	304	311	334	355	413	430	445
2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	533	618	644	668
2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
0.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-0.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-1.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-2.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-3.5	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800
-4.0	20	45	60	70	85	100	110	135	150	160	200	250	300	360	385	400	410	435	450	500	550	700	750	800

## Appendix H

# Sample MCFSS SOP



**UNITED STATES MARINE CORPS**  
6TH MARINE DIVISION (REIN)  
QUANTICO, VIRGINIA 22134-5021

DivO P3120.1  
G-3  
8 Aug 1994

### DIVISION ORDER P3120.1

From: Commanding General  
To: Distribution List

Subj: MARINE CORPS FIRE SUPPORT SYSTEM STANDARD  
OPERATING PROCEDURE (MCFSS SOP)

Ref: (a) FMFM 6-9, Marine Artillery Support  
(b) FMFM 6-18, Techniques and Procedures for Fire Support  
Coordination  
(c) FMFM 6-18-1, MCFSS Techniques and Procedures  
(d) FMFM 6-23/TC 6-40A, Field Artillery Automated Cannon  
Gunnery  
(e) ST 6-1-1, Lightweight Tactical Fire Direction System  
(LTACFIRE) Operations  
(f) ST 6-40-30, Battery Computer System Job Aids  
(g) TM 11-7440-283-12-1-1&2, Cannon Battery Computer  
System  
(h) TM 11-5840-354-10, Operators Manual for Radar Sets  
AN/TPQ-36(V)3  
(i) TM 08625A-10/1-1&2, Meteorological Data System  
AN/TMQ-31

Encl: (1) Locator Sheet

1. Purpose. To implement standard procedures and techniques in the use of automated fire direction and fire support coordination within the 6th Marine Division.
2. Cancellation. None.
3. General. Standard entries are required to allow the digital fire support systems to communicate and to avoid confusion during the processing of information. This standardization requires a much greater degree of precision than most voice/manual operations. The basis for this SOP is FMFM 6-18-1. Strict adherence to the procedures established in FMFM 6-18-1 and this SOP are paramount to our success in the digital arena. Commanding officers and staff section officers-in-charge will use this SOP as a basis for the operation of their digital devices.
4. Action. This SOP is effective upon receipt. Commanding officers and staff section officers-in-charge will use this SOP as a basis for the operation of their digital devices. This SOP will be present and readily available at all centers using automated/digital devices in the 15th Marines.
5. Certification. Reviewed and approved this date.

J. A. LEJEUNE

Distribution: A

DivO P3120.1

8 Aug 1994

**LOCATOR SHEET**

Subj: MCFSS SOP

Location: \_\_\_\_\_  
(Indicate the location(s) of the copy(ies) of this SOP)

**ENCLOSURE (1)**

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# 6TH MARINE DIVISION MCFSS SOP

## RECORD OF CHANGES

Log completed change action as indicated.

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**MCFSS SOP**

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**CHAPTER 1**

**OVERVIEW OF MCFSS**

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**MCFSS SOP****CHAPTER 1****OVERVIEW OF MCFSS**

1000. THE MARINE CORPS FIRE SUPPORT SYSTEM. The Marine Corps Fire Support System (MCFSS) provides an automated means for the conduct of fire support operations by linking most fire support agencies digitally. The fully implemented MCFSS is composed of the following equipment:

1. LCU. The AN/GYK-37(V1) Lightweight Computer Unit (LCU), loaded with Initial Fire Support Automated System (IFSAS) software, is located at all FSCCs, the MEF FFCC, and the DASC in a single terminal command post configuration.
2. BCT. The AN/GYG-1(V) Battlefield Computer Terminal (BCT) with software similar to the IFSAS LCU load is located at all FDCs in a dual terminal command post configuration.
3. BCS. The AN/GYK-37(V) Battery Computer System (BCS) is located at the battery FDC. This system will be replaced by the LCU loaded with BCS software.
4. DMS. The AN/PSC-2A Digital Message System (DMS) is provided to all forward observer teams and foot-mobile battalion FSCCs.
5. MDS. The AN/TMQ-31 Meteorological Data System (MDS) is located at the artillery regiment's meteorological section. The system will be replaced by the Meteorological Measuring System (MMS).
6. Firefinder Radar. The AN/TPQ-36 Firefinder Radar is located at the artillery regiment's target acquisition platoon.
7. U.S. Army Systems. MCFSS devices will communicate and operate with all field Army TACFIRE and IFSAS equipment.

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1001. SCOPE OF THIS DOCUMENT. MCFSS requires detailed planning and adherence to procedures for success. This SOP is based on FMFM 6-18-1. This SOP describes the detailed procedures to be used by all stations in MCFSS for the 6th Marine Division. Procedures set forth in this SOP are effective immediately. These procedures may be altered by appropriate sections to operations orders.

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**CHAPTER 2**

**COMMUNICATIONS**

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**MCFSS SOP****CHAPTER 2****COMMUNICATIONS**

2000. PROCEDURE. The digital procedures used in the 6th Marine Division will comply with those established in reference (c) to this SOP. These procedures will only be modified when directed by this SOP and/or appropriate sections of operations orders.

2001. COMMUNICATIONS PARAMETERS

1. Nets. Data communications nets will be configured as per chapter 1 of reference (c). Standard net settings and parameters for digital communications will be provided in Enclosure 2 (Data Guard Chart) to Tab J (MCFSS Plan) of Appendix 12 (Fire Support) of Annex C (Operations) of operations orders.

2. Subscribers. Each net control station is responsible for providing the digital subscriber table for its net(s). The system of standard logical names, addressing, and subscriber identification is published in chapter 2 of reference (c). This data is published in Enclosure 3 (Subscriber Table) to Tab J (MCFSS Plan) of Appendix 12 (Fire Support) of Annex C (Operations) of operations orders.

3. Message of Interest. Message of interest (MOI) processing among LCU and BCT stations is the crux of information transfer required to operate MCFSS. The MOI setup established in chapter 2 of reference (c) will be used. Additional modifications are directed in paragraph 12 of Tab J (MCFSS Plan) of Appendix 12 (Fire Support) of Annex C (Operations) of the operations order. In addition, using stations may establish additional MOI messages that do not alter the required data flow as directed in reference (c).

4. PCLD Changes. The priority, classification, logging, and display (PCLD) changes published in chapter 2 of reference (c) apply. Stations may make additional changes. However, caution must be exercised. Changing the display default for executable messages to NO causes that message to automatically process.

## MCFSS SOP

5. Legal Messages. When a subscriber is established, all stations will assign default legal messages to that subscriber. To ensure messages are not received in the alert queue, all messages will be made legal for each BCT and LCU equipped subscriber.
6. Default Subscriber. Default subscriber assignments in paragraph 2006 of reference (c) will be used and will not be altered unless directed by operations orders.
7. Multisubscriber Groups. Required multisubscriber groups will be entered as directed in Enclosure 3 (Subscriber Table) to Tab J (MCFSS Plan) of Appendix 12 (Fire Support) of Annex C (Operations) of the operations order. Stations may enter and use additional multisubscriber groups as required.
8. Changes to Established Communications Criteria. During the course of operations, communications requirements may dictate changes to the communications parameters and subscriber data. Changes are requested through the net control station for that net and must be directed by that station. Fixed format relay addresses will only be assigned by the NCS.

2002. COMMUNICATIONS ETIQUETTE

1. Entering the Net. Stations entering the net will establish voice communications on the appropriate communications coordination net using the radio/communications equipment assigned for the data net. (Bn FD Net voice for FOs, battery FDCs, and battalion FSCCs entering COF nets.) When satisfactory voice communications are established, the net control station directs the station to enter the data net and to send a digital communications check. The subscriber station changes frequencies from the communications coordination net to the data net and transmits communications checks digitally.
2. Troubleshooting. Communications troubleshooting will be directed by the net control station on the appropriate communications coordination (Bn FD Net for stations on the COF nets.)

**MCFSS SOP**

3. Loss of Digital Communications. If a station loses digital communications and is unable to reestablish communications, that station will continue operations on an appropriate voice net.

a. Procedure. The following procedures apply:

- (1) Troubleshoot all software settings.
- (2) Troubleshoot hardware including radio and antennas, checking with "BIRD" if possible.
- (3) Establish voice communications on the appropriate net (see Table 2-1).
- (4) Continue to use the digital computers to process information, making entries from the keyboard, if possible.
- (5) Continue to troubleshoot the data net.

## MCFSS SOP

Table 2-1

LOSS OF DIGITAL COMM ON:	ESTABLISH VOICE COMM ON:	REMARKS
MEF FFC Net (D)	MEF FFC Net (V)	
Div FSC Net (D)	Div FSC Net (V)	
Regt FSC Net (D)	Supporting Arty Bn FD1 Net(V)	
Regt FD2 Net(D)	Regt FD1 Net(V)	
Bn FD2 Net(D)	Reinforced Arty Bn FD1 Net(V)	
COF Net (D)	Supporting Arty Bn FD1 Net(V)	If a number of stations are forced to communicate on the Bn FD1 Net(V), one of the data COF nets will be operated as a voice net and FOs, battery FDCs, and battalion FSCCs requiring voice communications are directed to that net.

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**CHAPTER 3**

**COMMANDER'S MODIFICATION FILES**

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Current Plan Commander's Modification File .....	3001	3-3
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Artillery Target Intelligence Modification File .....	3003	3-9

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**MCFSS SOP****CHAPTER 3****COMMANDER'S MODIFICATION FILES**

3000. GENERAL. The BCT/LCU allows the input of three commander's modification files.

1. The fire mission modification file provides the computer with parameters used in target analysis. These entries result in the computers determination of volume of fire and fire unit selection.
2. The fire plan modification file provides tactical fire control solution guidance to be used for a fire plan in the same manner as the fire mission modification file is used for fire mission processing.
3. Entries in the Artillery Target Intelligence (ATI) modification file form the basis for targeting solutions and generation of fire missions on high payoff targets.

3001. CURRENT PLAN COMMANDER'S MODIFICATION FILE

1. FM;MOD. Table 3-1 provides SOP entries for the FM;MOD message.

## MCFSS SOP

Table 3-1

<b>IGAMMO:</b>	<b>NO</b>	<b>SADARM CRITERIA</b>	
<b>MLRSIZ:</b>	<b>250</b>	<b>MNFLOT</b>	<b>1,500</b>
<b>ECOF:</b>	<b>05 (0.5%)</b>	<b>VOLLEYS/AP</b>	<b>2</b>
<b>AUTOFF:</b>	<b>NO</b>	<b>MAXRV</b>	<b>100</b>
<b>PZONE:</b>	Zone of the Main Effort of the Supported Unit.	<b>TARGET SEGMENTATION CRITERIA</b>	
		Threshold Radius	<b>250 (Battalion FDC) 500 (Regimental FDC)</b>
		Maximum Segments	<b>3 (Battalion FDC) 5 (Regimental FDC)</b>
<b>PTYPE:</b>	<b>ARTY/UNKNOWN</b>	Minimum Segments	<b>2</b>
<b>PSHELL:</b>	<b>HEF</b>	Delta Time	<b>4 Minutes</b>

2. FM;FUSEL

a. Fire Unit Ordering. Table 3-2 provides the required fire unit ordering. Order values may be modified at FDCs as required; however, all stations will comply with the ordering of units as listed.

## MCFSS SOP

Table 3-2

STATION	FU ORDERING
MEF FFCC	None required.
Division FSCC	None required.
DASC	None required.
Regimental FSCC	All artillery units ordered under the DS artillery battalion name. All 81mm mortar platoon ordered with a higher number (lower precedence) than artillery, under the battalion FSCC name.
Battalion FSCC	All artillery units ordered under the DS artillery battalion name. The 81mm mortar platoon ordered with a higher number (lower precedence) than artillery, under the battalion FSCC name.
Regimental FDC	All artillery units ordered under their parent battalion name. Ordering values are established to cause GS, GSR, R, and finally DS units to be chosen for firing.
Regimental TPC	None required.
Battalion FDC	Batteries of the DS battalion ordered under the battalion name. Batteries of the R battalion ordered with a higher number (lower precedence) than DS artillery, under the R battalion name.

b. Maximum Volleys. Table 3-3 provides the maximum volleys entry for use at all stations.

Table 3-3

STATION	MAX VOLLEYS
81mm Mortar	6
105mm Howitzer	4
155mm Howitzer	3
All Naval Guns	6

## MCFSS SOP

3. **FM:XCLUDE.** Table 3-4 provides exclusions required for operations. Additional exclusions are added as required.

Table 3-4

STATION	EXCLUSION
MEF FFCC	All weapon types.
Division FSCC	All weapon types.
DASC	All weapon types.
Regimental FSCC	None.
Battalion FSCC	None.
Regimental FDC	No artillery fire units.
Regimental TPC	All weapon types.
Battalion FDC	All fire units not organic to the battalion or the reinforcing battalion.

4. **FM:ATTACK.** Attack criteria is situation-dependent. However, table 3-5 provides a point of departure to be modified by operations orders as required.

Table 3-5

Target	Volleys	Effects	Target	Volleys	Effects
<b>ADA</b>			<b>ARMOR</b>		
Unknown	1		Unknown	1	
Light		5%	Light		4%
Medium		5%	Medium		3%
Heavy		5%	Heavy	3	
Missile		5%	APC		5%
Position	1		Position	2	

## MCFSS SOP

Table 3-5 (continued)

Target	Volleys	Effects	Target	Volleys	Effects
<b>ARTY</b>			<b>ASSY</b>		
Unknown	1		Unknown	1	
Light		5%	Troop		7%
Medium		5%	TRPVEH		5%
Heavy		5%	TRPMEC		3%
Position	2		TRPARM		3%
<b>BLDG</b>			TACBTR		3%
Unknown	1		ADMBTR		4%
Wood	1		TACBMP		3%
Concrete	2		ADMBMP		4%
Masonry	2		TNKBNT	3	
Metal	1		TNKBNA	3	
Special Purpose	1		SPRTEL		3%
<b>FORM</b>			<b>BRIDGE</b>		
AGBBTR		3%	Wood	1	
AGBBMP		3%	Concrete	2	
AGBTKR	3		Steel	2	
MRBMNR		4%	Foot Pontoon	1	
MRBMNP		4%	Vehicle Pontoon	1	
TNKBNM	3		Site	1	
MRBSPR		5%	Raft	1	
TNKBNS	2		Ferry	1	

## MCFSS SOP

Table 3-5 (continued)

Target	Volleys	Effects	Target	Volleys	Effects
<b>CEN</b>			<b>EQUIP</b>		
Unknown		10%	Unknown	1	
Small		10%	Radar	1	
Battalion		10%	Guidance	1	
Regiment		7%	EW	1	
Division		5%	Loudspeaker	1	
Forward		10%	Search Light	1	
<b>MORT</b>			<b>PERS</b>		
Unknown	1		All Types Prand		10%
Position	1		All Types Prone		10%
Light	1		All Types Prug		7%
Medium		8%	All Types Dugin	2	
Heavy	2		All Types Cover	2	
Very Heavy	2		All Types Prover	2	
<b>RKTMSL</b>			<b>SUPPLY</b>		
All Types		10%	All Types	1	
<b>TERR</b>			<b>VEH</b>		
All Types	1		All Types		10%
<b>WPN</b>					
All Types	1				

Subordinate commands may alter the commander's attack method to fit their missions. However, target types will be maintained as volleys or effects targets as issued by the division FSCC.

5. **FM;CENTER.** FM;CENTER files are automatically created when the fire unit ordering dictated in paragraph 3001.2b is entered.

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3002. **FIRE PLAN COMMANDER'S MODIFICATION FILE**. Fire plan commander's modification files are created by copying from the current modification file and making necessary changes.

3003. **ARTILLERY TARGET INTELLIGENCE MODIFICATION FILE**. ATI file entries are dependent upon the tactical situation, high payoff target list, and target acquisition agencies available, to name a few. As such, no standard entries are established, but will be published in the Tab J (MCFSS Plan) of Appendix 12 (Fire Support) of operations orders.

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**CHAPTER 4**

**SUPPORT FILES**

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On-Call Fire Support Coordination Measures ..... and Boundaries	4002	4-3

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**MCFSS SOP****CHAPTER 4****SUPPORT FILES**

4000. NAMING OF FIRE SUPPORT COORDINATION MEASURES AND BOUNDARIES. All support geometry will be named in accordance with Appendix A of reference (c).

4001. MANAGEMENT OF GEOMETRY

1. FLOT Management. Regimental FLOTs will be established within the 6th Marine Division. Each regimental FSCC assigns FLOT point numbers from the regimental FLOT to each of the battalion FSCCs. Each observer whose supported company is in contact is assigned two numbered FLOT points by the battalion FSCC from its allocated numbers.

a. Reporting. The observer reports his two points when stationary and every 15 minutes when moving. The battalion FSCC is responsible for ensuring that the received points are numbered in ascending order from left to right as facing the enemy.

b. Updating. Updating points is accomplished by transmitting the assigned points with new grids.

2. CFL Management. The CFL is maintained at the division FSCC and updated by the division FSCC based on advances in the FLOT.

3. Phase Lines. Phase lines are established by the division FSCC to assist in movement control. Up to four phase lines may be entered as CFLs named as phase lines.

4002. ON-CALL FIRE SUPPORT COORDINATION MEASURES AND BOUNDARIES. On-call (future) fire support coordination measures and boundaries are entered in **PLAN:ONCALL** and disseminated to lower echelons by manual transmission. The responsible FSCC will cause the measure to be activated by entering and transmitting a **SPRT;BUILD** message with option **BUILD CURRENT FROM EXISTING;\_\_\_\_\_** [measure's name].

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**CHAPTER 5**

**AMMUNITION AND FIRE UNIT FILES**

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**MCFSS SOP****CHAPTER 5****AMMUNITION AND FIRE UNIT FILES**

5000. GENERAL. All stations in MCFSS handle ammunition and artillery fire unit (AFU) files. This chapter provides specific guidance for generating and checking AFU files.

5001. FIRE UNIT UPDATES. Fire Unit Updates (AFU;UPDATES) will be entered by the following units:

1. Battery FDCs. Battery FDCs enter AFU;UPDATES at the BCS and transmit them to the battalion FDC where they are stored and disseminated by MOI processing. Only one AFU;UPDATE is transmitted per battery. The second BCS will not transmit an additional AFU;UPDATE.

2. Battalion FSCC. The battalion FSCC will enter the 81mm mortar platoon. The 81s must be entered using M29A1 as the weapon since M252 is not available. Enter the correct max ranges. The computer will output an alert indicating that these ranges are excessive but still accepts the data.

3. Naval Surface Fire Support. All naval surface fire support units are entered by the units that they support. Each gun caliber is entered as a separate AFU;UPDATE if the ship possesses mixed armament.

4. Specific Entries. The following specific entries will be made:

a. APL:\_\_\_\_ [all types]

b. RT:0

c. Battery FDCs enter the maximum elevation achieved by the gun with the lowest maximum QE as MAXEL:\_\_\_\_\_.

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**CHAPTER 6**

**FIRE MISSION PROCEDURES**

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**MCFSS SOP****CHAPTER 6****FIRE MISSION PROCEDURES**

6000. **METHOD.** The standard method of fire mission processing in the 6th Marine Division is the FSCC Approval Mode. This mode is described in paragraph 4002 of reference (c). Specific procedures are described here.

6001. **PROCESSING OF AREA FIRE MISSIONS**

1. **Equipment Setup.** The following provides required setup entries to process missions in the FSCC Approval Mode of operations.

a. **Forward Observer's DMS Setup.** The FO DMS is initialized with the following entries:

(1) **FIST:YES**

(2) **DFLT DEST:\_\_\_\_\_ [Battalion FSCC]**

b. **Battalion FSCC Setup.** The battalion FSCC establishes LCU setup as per chapters 1 and 2 of reference (c). Entries of particular importance are —

(1) **PCLD** entered with **FM;CFF** and **FM;SUBS** as **DISPLAY;YES**.

(2) **FM;FUSEL** entries as stated in chapter 3 of this SOP.

(3) **FM;ATTACK** criteria in accordance with the battalion commander's operations order guidance.

c. **Battalion FDC Setup.** The battalion FDC establishes BCT setup per chapters 1 and 2 of reference (c). Entries of particular importance are —

(1) **FM;FUSEL** entries as stated in chapter 3 of this SOP.

(2) **FM;ATTACK** criteria in accordance with the battalion commander's operations order guidance.

## MCFSS SOP

d. Battery FDC Setup. Enter the battalion FDC's logical name in the RPTAMMO field of the SYS;SETUP message.

2. Area Fire Missions. Area fire missions received from observers are processed as described in table 6-1.

Table 6-1

Step	Agency	Message	Remarks
1	FO/ DMS	FR	FO transmits digital call for fire to battalion FSCC. Ensures that DOP is only entered if TYPE is PERSONNEL or target will be processed at BCT/LCU as PERS/UNK with transmitted DOP.
2	Battalion FSCC LCU	FM;CFF	FO's FR is received as FM;CFF. Received message is queued in the priority queue. Battalion FSCC operator — <ul style="list-style-type: none"> <li>• Displays the message.</li> <li>• Determines if mission is request for illumination, FASCAM, Copperhead, or FPF.</li> <li>• Records mission on fire mission log.</li> <li>• Plots mission and attempts to clear or coordinate.</li> <li>• Goes to the appropriate table if any of the following occurs: <ol style="list-style-type: none"> <li>a. If mission is denied, goes to table 4-2.</li> <li>b. If mission requires coordination across boundary, goes to table 4-3.</li> <li>c. If mission is request for illumination, FASCAM, Copperhead, or FPF, goes to paragraph 6002.</li> </ol> </li> <li>• Otherwise, ACTION, ENTERS the FM;CFF.</li> </ul>
3	Battalion FSCC	FM;CFF	Fire mission solution is placed in the priority queue and also appears in the fire mission file. Displays fire mission chain from priority queue and records target number. Transmits FM;CFF addressed to battalion FDC.

## MCFSS SOP

Table 6-1 (continued)

Step	Agency	Message	Remarks
4	Battalion FDC	FM;CFF	FM;CFF is received in priority queue. Mission is known to be cleared since battalion FSCC transmitted message. Battalion FDC — <ul style="list-style-type: none"> <li>• Records the mission.</li> <li>• Plots the mission and determines and enters altitude on FM;CFF.</li> <li>• Processes mission. Transmits FM;MTO and FM;CFF:Os.</li> </ul>
5A	Battalion FSCC	FM;MTO	FM;MTO is received and automatically retransmitted to FO. FM;MTO prints on printer. Records passing of FM;MTO on fire mission log.
5B	Battery FDC	FM;CFF:O	Battery FDC plots target location and determines appropriate lot and charge to ensure required accuracy for mission. FM;CFF:O is executed and fire commands transmitted to guns' GDUs.
5C	FO	MTO	FO examines MTO. MTO is automatically associated with mission based on mission buffer number.
5D	Battery FDC	FM;MTO	Battery FDC displays blank FM;MTO, enters target number, probable error in range, and time of flight, and transmits to battalion FDC. Battalion FDC retransmits to FO automatically.
6	Battery FDC	FM;FOCMD	If mission is AMC, transmits FM;FOCMD:READY to FO. Transmits FM;FOCMD:SHOT when appropriate. Transmits FM;FOCMD:SPLASH only if firing high angle, firing for an AO or UAV FO, or if requested. Transmits FM;FOCMD:RDCOMP if appropriate.
7	Battalion FDC, Battalion FSCC	FM;FOCMD	These messages print at BCT/LCU but are automatically retransmitted as long as PCLD default of DISPLAY:NO is not altered in FM;FOCMD.

## MCFSS SOP

Table 6-1 (continued)

Step	Agency	Message	Remarks
8	FO	FM;FOCMD	If mission was AMC, transmits <b>FIRE</b> at appropriate time. This command passes <u>automatically</u> through all devices to GDUs.
9	FO	SUBS ADJ	FO transmits <b>SUBS ADJ</b> to battalion FSCC.
10	Battalion FSCC	FM;SUBS	Battalion FSCC <b>ACTION, ENTERS FM;SUBS</b> and transmits <b>FM;SUBS</b> to battalion FDC.
11	Battalion FDC	FM;SUBS	Battalion FDC processes <b>FM;SUBS</b> in same fashion as <b>FM;CFF</b> , repeating steps 4-5 above except no new <b>MTO</b> is transmitted.
12	FO	EOM & SURV	FO completes mission. Requests <b>EOM</b> or <b>EOMRAT</b> using <b>EOM &amp; SURV</b> message. Enters <b>DISPOSITION</b> and <b>CASUALTIES</b> .
13	Battalion FSCC	FM;SUBS EOM:YES	Mission is ended and <b>FM;SUBS</b> is generated to transmit to battalion FDC. If FO selected <b>EOMRAT</b> , adjusted location is stored as <b>KNPT</b> at battalion FSCC.
14	Battalion FDC	FM;SUBS EOM:YES	Mission is ended and <b>FM;SUBS</b> is generated for battery FDCs. An <b>AFU;MFR</b> is generated to report mission to target pool at division FSCC. Transmits <b>FM;SUBS</b> and enters <b>AFU;MFR</b> .
15	Battery FDC	FM;SUBS	Battery FDC executes <b>FM;SUBS</b> to end mission. BCS automatically generates <b>AFU;AMMO:E</b> to update battalion FDC's ammunition count.
16	Battalion FDC	AFU; AMMO:E	Enters <b>AFU;AMMO:E</b> to update ammunition count and MOI the message.

3. Denial of Missions. Table 6-2 describes the steps used at either the battalion FSCC or battalion FDC to deny a fire mission. This procedure discusses ending the mission when it is received. However, a fire mission may be denied by transmitting a new **FM;MTO** with **UNITS:0, VOL:0** at any time.

## MCFSS SOP

Table 6-2

Step	Agency	Message	Remarks
1	Battalion FSCC or FDC	<b>FM;CFF</b>	Decision is made to deny fire mission.
2	Battalion FSCC or FDC	<b>FM;CFF</b>	Discards fire mission chain, except <b>FM;MTO</b> , from priority queue. Mission remains active in fire mission file.
3	Battalion FSCC or FDC	<b>FM;MTO</b>	Enters <b>UNITS:0</b> and <b>VOL:0</b> to indicate mission is denied and transmits to FO.
4	FO	<b>FM;MTO</b>	Displays <b>MTO</b> . Note <b>UNITS:0</b> and <b>VOL:0</b> . Composes and transmits <b>EOM &amp; SURV</b> message with <b>EOM</b> to clear battalion FSCC and FDC mission files.
5A	Battalion FSCC	<b>FM;SUBS</b>	Mission ends; transmits <b>FM;SUBS</b> that is generated in priority queue to battalion FDC.
5B	Battalion FDC	<b>FM;SUBS</b>	Battalion FDC processes <b>EOM</b> and discards <b>AFU;MFR</b> that is generated.
6	FO	<b>ATI GRID</b>	If target is likely to remain in place for at least two hours, transmits an <b>ATI</b> report of the target to battalion FSCC.

#### 4. Missions Requiring Coordination Across Unit Boundaries.

Cross-boundary clearance will be requested when fires plot within 300 meters of a boundary and are known to be behind the adjacent unit's CFL or when the adjacent unit's CFL is not certainly known. Table 6-3 describes the process for requesting cross-boundary clearance.

## MCFSS SOP

Table 6-3

Step	Agency	Message	Remarks
1	Battalion FSCC or FDC	FM;CFF	Plots target and determines clearance with adjacent unit is required. Battalion FSCC <b>ACTION, ENTERS FM;CFF</b> and determines solution addressed to supporting battalion FDC. Battalion FSCC enters <b>REQ CLR</b> in <b>PTM</b> field and readdresses and transmits <b>FM;CFF</b> to regimental FSCC.
2	Regimental FSCC	FM;CFF	Regimental FSCC receives <b>FM;CFF</b> . Since fire missions are forwarded only if clearance is required, <b>PTM:REQ CLR</b> prompts regimental FSCC to seek clearance. Target is plotted and <b>FM;CFF</b> is <b>ACTION, ENTERED</b> . Solution is addressed to battalion FDC. Regimental FSCC readdresses <b>FM;CFF</b> and transmits to unit from which clearance is required, or if mission is denied, completes <b>SYS;PTM:___ [target number] DENIED</b> and transmits it to requesting FSCC.
3	Affected FSCC	FM;CFF	Affected FSCC clears mission or continues to pass <b>FM;CFF</b> to affected subordinate FSCC that can clear mission.
4	Affected FSCC	SYS;PTM	Clearance or denial is transmitted back through chain of requestors via <b>SYS;PTM: [target number] DENIED</b> or <b>CLRD</b> . <b>PTM</b> is passed, and target is deleted from <b>FM</b> file.
5	Battalion FSCC	SYS;PTM	If mission is denied, table 6-2 beginning at step 1 applies. If mission is cleared, generates new copy of <b>FM;CFF</b> using <b>FM;CMD</b> message with option <b>EDIT FM FILE</b> ; and then displays <b>FM;CFF</b> from priority queue, addresses it, and transmits it to battalion FDC.

## MCFSS SOP

6002. PROCEDURES FOR FASCAM, ILLUMINATION, COPPERHEAD, AND FPF MISSIONS. FASCAM, illumination, Copperhead, and FPF missions will not process through a **FM;CENTER** file. Therefore, these missions must be transmitted to the battalion FDC. The battalion FDC will request clearance via **SYS;PTM** from the appropriate battalion FSCC.

1. General Procedures. Table 6-4 describes the steps necessary to coordinate and pass these missions from the FO through the battalion FSCC to the FDCs.

Table 6-4

Step	Agency	Message	Remarks
1	FO	<b>FR</b>	FO composes <b>FR</b> requesting <b>FASCAM, ILLUM, CPHD</b> or <b>FPF</b> .
2	Battalion FDC	<b>FM;CFF</b>	Battalion FDC receives <b>FM;CFF</b> and determines mission is type that will not process through <b>FM;CENTER</b> file. Battalion FDC performs the following: <ul style="list-style-type: none"> <li>• Enters the displayed <b>FM;CFF</b>.</li> <li>• Plots target and determines if target must be denied or requires coordination. If mission is denied, completes <b>SYS;PTM</b> with [target number] <b>DENIED</b> and transmits to requesting FDC; or transmits <b>SYS;PTM</b> to battalion FSCC in whose zone target plots. The latter <b>SYS;PTM</b> will include target number, munitions mnemonics, and six place grid with <b>REQ CLR</b>.</li> </ul>
3	Battalion FSCC	<b>SYS;PTM</b>	Battalion FSCC determines that mission requires clearance ( <b>PTM:REQ CLR</b> ), plots the mission, and transmits <b>SYS;PTM</b> back to battalion FDC with <b>CLRD</b> or <b>DENIED</b> in place of <b>REQ CLR</b> .
4	Battalion FDC	<b>FM;SUBS</b>	On receiving <b>EOM</b> , battalion FDC transmits copy of <b>AFU;MFR</b> for mission by selecting <b>ACTION, XMIT</b> , then <b>ACTION, ENTER</b> to notify battalion FSCC that this mission has ended.

## MCFSS SOP

2. Illumination Procedures. All illuminations missions will be established as **ILLUM ONLY** by the observer. If coordinated illumination is required, the HE mission will be established as a separate mission. The observer will request the times of flight for both missions and control the firing by using method of control "At My Command."

3. Copperhead Procedures. If preplanned, Copperhead missions will be transmitted directly to the battery FDC after coordination with the battalion FDC. Copperhead target-of-opportunity missions follow the same sequence of events as described in table 6-4. The designate command is transmitted from the battalion FDC directly to the FO at the appropriate time.

4. FPF Procedures. All requests for FPFs will be transmitted via **SYS;PTM** to the battalion FSCC. The battalion FSCC will approve or disapprove and transmit approved requests to the battalion FDC. When ready, the battalion FDC will alert the FO to transmit the fire request. The fire request will contain the following information:

- a. Target location.
- b. Control (use **EOM** for unadjusted FPFs or adjust fire).
- c. Target size rectangular.

(1) Length — not greater than an effective sheaf front. This distance is equal to the number of pieces firing multiplied by the munitions burst width (i.e., 50m for a 155mm shell or 30m for a 105mm shell).

(2) Width — use **50**, the smallest entry available at the DMS.

(3) Attitude — enter the attitude of the long axis of the target.

(4) Priority — select **ASSIGN FPF**.

**MCFSS SOP****CHAPTER 7****ARTILLERY TARGET INTELLIGENCE OPERATIONS**

	<b>Paragraph</b>	<b>Page</b>
<b>Purpose .....</b>	<b>7000</b>	<b>7-3</b>
<b>Artillery Target Intelligence Modes .....</b>	<b>7001</b>	<b>7-3</b>
<b>Artillery Target Intelligence Modification .....</b> <b>File Criteria</b>	<b>7002</b>	<b>7-3</b>
<b>Maintenance of the Target File .....</b>	<b>7003</b>	<b>7-4</b>

**MCFSS SOP**

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**MCFSS SOP****CHAPTER 7****ARTILLERY TARGET INTELLIGENCE OPERATIONS**

7000. **PURPOSE.** The artillery target intelligence function of MCFSS is used to report targets and target indicators to the central target pool. This target pool takes the form of the target file maintained by the GCE FSCC. Here, duplications are resolved and fire missions are generated to attack high payoff targets. This target file's purpose is to provide an up-to-date data base as the source of fire plan targets for all stations.

**7001. ARTILLERY TARGET INTELLIGENCE MODES**

1. **General.** The BCT/LCU is operated in one of three **ATI** modes dependent upon the function of each station. Compliance with this paragraph is required to provide transfer of **ATI** data through the system.

2. **Artillery Target Intelligence Mode 1 Stations.** The following stations will operate in **ATI MODE 1**:

- Battalion FSCCs
- Regimental FSCCs
- DASC
- MEF FFCC

3. **Artillery Target Intelligence Mode 2 Stations.** The battalion FDCs operate in **ATI MODE 2** with the regimental FDC as the default subscriber.

4. **Artillery Target Intelligence Mode 3 Stations.** The following stations operate in **ATI MODE 3**:

- Division FSCC (or the senior GCE FSCC in smaller operations)
- TPC
- Regimental FSCCs

7002. **ARTILLERY TARGET INTELLIGENCE MODIFICATION FILE CRITERIA.** The criteria used in the **ATI** modification file is situation- and mission-dependent. These are published in operations orders. The division

## MCFSS SOP

FSCC and TPC will enter the same criteria, except in the **ATI;FMMOD** the TPC will generate fire missions on solution reports only. The division FSCC updates the criteria and transmits the updates to the TPC in the form of the appropriate **ATI** modification file message; e.g., **ATI;SVMOD**, **ATI;FMMOD**, etc.

7003. MAINTENANCE OF THE TARGET FILE. All stations that store targets are responsible for managing the target file in accordance with published directions provided in operations orders. The following additional directions apply.

1. Maintenance of the Target List. Two stations specifically store targets and resolve duplications in the target lists through combination. These two stations are the TPC and the division FSCC.

a. TPC. The TPC stores targets to provide a target file for counterfire operations conducted at the regimental FDC. The TPC stores those targets that are received from radars under its control. These target reports are received and stored in the form of **ATI;CDRs**. In addition, the TPC receives counterfire targets via **ATI;SRIs** established at the division FSCC by the TPC and regimental FDC. See paragraph 2006 of reference (c) for a list of the required SRIs.

b. Division FSCC. The division FSCC receives all targets and target reports transmitted by any station in the division. These **ATI** reports are passed through the system from their point of origin to the division FSCC via MOI processing or default subscriber retransmission. The targets automatically store, and duplications are resolved through combination as governed by the **ATI;SVMOD** message. The division FSCC is responsible for deleting targets periodically as the situation dictates.

2. Nomination of Targets to the Target List. All stations submit their nominations to the target list in the form of **ATI;CDRs**. These are transmitted into the system differently depending upon the station:

a. FOs complete the message and transmit to the battalion FSCCs.

b. Battalion FSCCs enter **ATI;CDRs**, and the messages are transmitted to the regimental FSCC via MOI processing.

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- c. Regimental FSCCs enter **ATI;CDRs**, and the messages are transmitted to the division FSCC via MOI processing.
  - d. Battery FDCs transmit **ATI;CDRs** to the battalion FDC.
  - e. Battalion FDCs enter **ATI;CDRs** which are automatically transmitted to the regimental FDC via default subscriber processing.
  - f. Regimental FDCs enter **ATI;CDRs** which are automatically transmitted to the regimental FDC via MOI processing
3. Resolution of Duplication Targets. Target duplication is resolved automatically at the division FSCC. This resolution is controlled by entries made in the **ATI;SVMOD** message. The entries are dictated by the MCFSS Plan Tab of operations orders.
4. Dissemination of the Target List. The division FSCC maintains the updated target file but does not disseminate the target list. Instead, regimental FSCCs will search the division FSCC's target file continuously by establishing SRIs at the division FSCC for all targets in their zone. Battalion FSCCs and battalion FDCs will —
- a. Delete from the computer all targets that are older than two hours using an **ATI;SRCH** message.
  - b. Complete and transmit an **ATI;SRCH** message for a level 1 report of all targets in the FSCC's zone and any additional **ATI;SRCHs** deemed necessary.
  - c. Further limit or increase the search if the count of targets received is not satisfactory.
  - d. Transmit the search criteria requesting a level 3 report when the number of targets is satisfactory.

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**MCFSS SOP****CHAPTER 8****FIRE PLANNING**

	Paragraph	Page
General .....	8000	8-3
Counterfire Planning .....	8001	8-3
FASCAM Planning .....	8002	8-3
Normal Fire Planning .....	8003	8-3

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**MCFSS SOP****CHAPTER 8****FIRE PLANNING**

8000. GENERAL. This chapter addresses the fire planning procedures to be used in the 6th Marine Division. Fire planning will be divided into counterfire planning, FASCAM planning, and all other normal fire planning.

8001. COUNTERFIRE PLANNING. Counterfire planning is the responsibility of the artillery regiment. This responsibility is split between the TPC and regimental FDC. The procedures in paragraph 6002 of reference (c) provide a detailed explanation of counterfire planning.

8002. FASCAM PLANNING

1. Authority. Authority to fire FASCAM resides at the division FSCC. All FASCAM fire missions and fire plans must be cleared by the division FSCC.

2. Procedures. The procedures for building a FASCAM fire plan and for acquiring clearance for a FASCAM mission are published in paragraph 6005 of reference (c).

8003. NORMAL FIRE PLANNING

1. All fire planning, other than counterfire and FASCAM planning, is conducted using procedures set forth in paragraph 6003 of reference (c).

2. Quick fire support plans are created by transmitting the **TISF** from the FSCC to the FDC. The specific procedures are published in paragraph 6004 of reference (c).

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## Appendix I

# Sample MCFSS Plan

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**TAB J (Marine Corps Fire Support System Plan) to Appendix 12  
(Fire Support) to Annex C (Operations) to Operations Order 1-94**

Ref: (a) Division MCFSS SOP V10  
(b) Maps: Thailand Series L7017, 1:50,000; Ban Khun Song Sheet  
5335 II and Ban Chan Khrem Sheet 5345 III

Time Zone: ZULU

### 1. SITUATION

See paragraph 1 of the basic order.

### 2. ORGANIZATION FOR COMBAT

<u>FIRE SUPPORT</u>	<u>MISSION</u>	<u>SUPPORTING</u>
<u>_/_/_/15/MR_ (15M)</u>		<u>F/S/C/6_/MD_</u>
<u>_/_/_/1_/15_ (115)</u>	DS	<u>F/S/C/22/MR_</u>
<u>_/_/_/2_/15_ (215)</u>	DS	<u>F/S/C/4_/MR_</u>
<u>_/_/_/3_/15_ (315)</u>	GS	<u>F/S/C/6_/MD_</u>
	O/O DS	<u>F/S/C/29/MR_</u>
<u>_/_/_/5_/15_ (515)</u>	R	<u>_/_/_/2_/15_</u>
	O/O GS	<u>F/S/C/6_/MD_</u>

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3. OBSERVER AND RADAR ASSIGNMENTS

<u>UNIT</u>	<u>ASSIGNED OBSERVER/RADAR</u>	<u>FLOT POINTS</u>
F/S/C/1_/4_ (1A4)	F/O/A/41/___	01-02
	F/O/B/42/___	03-04
	F/O/C/43/___	05-06
F/S/C/2_/4_ (2A4)	F/O/E/44/___	07-08
	F/O/F/45/___	09-10
	F/O/G/46/___	11-12
F/S/C/3_/4_ (3A4)	F/O/E/44/___	13-14
	F/O/F/45/___	15-16
	F/O/G/46/___	17-18
F/S/C/1_/22_ (122)	F/O/A/21/___	01-02
	F/O/B/22/___	03-04
	F/O/C/23/___	05-06
F/S/C/2_/22_ (222)	F/O/E/24/___	07-08
	F/O/F/25/___	09-10
	F/O/G/26/___	11-12
F/S/C/3_/22_ (322)	F/O/E/24/___	13-14
	F/O/F/25/___	15-16
	F/O/G/26/___	17-18
_/_/_/15/MR_ (15M)	C/M/R/01/___	
	C/M/R/02/___	
	C/M/R/03/___	
	C/M/R/04/___	
	U/A/V/09/___	
	F/O/F/45/___	
	F/O/G/46/___	

4. MAP MODIFICATION DATA

Maximum Easting: 202000

Minimum Easting: 798000

Maximum Northing: 1467000

Minimum Northing: 1438000

Grid Zone: +47

Spheroid: EVEREST

Datum: INDIAN

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5. TARGET NUMBER ASSIGNMENTS

<u>STATION</u>	<u>TARGET BLOCK</u>
F/S/C/6_/MF_ (6MF)	AQ0000-0999
F/S/C/6_/MD_ (6MD)	AQ1000-1999
D/A/S/6_/AW_ (6AW)	AQ4000-4999
F/S/C/4_/MR_ (4MR)	AD0000-0999
F/S/C/1_/4_ (1A4)	AD1000-1999
F/S/C/2_/4_ (2A4)	AD2000-2999
F/S/C/3_/4_ (3A4)	AD3000-3999
F/S/C/22/MR_ (22M)	AS0000-0999
F/S/C/1_/22_ (122)	AS1000-1999
F/S/C/2_/22_ (222)	AS2000-2999
F/S/C/3_/22_ (322)	AS3000-3999
F/S/C/29/MR_ (29M)	AZ0000-0999
F/S/C/2_/29_ (229)	AZ2000-2999
F/S/C/3_/29_ (329)	AZ3000-3999
T/F/S/1_/MN_ (TFS)	AR0000-0999
F/S/C/1_/29_ (129)	AR1000-1999
F/S/C/6_/LAI (6LA)	AR2000-2999
_/_/15/MR_ (15M)	AQ6000-6999
T/P/C/15/MR_ (15T)	AQ7000-7999
_/_/A/6_/27_ (627)	AQ9400-9599
_/_/1_/15_ (115)	AS4000-4999
_/_/A/1_/15_ (A15)	AS5000-5199
_/_/B/1_/15_ (B15)	AS5200-5399
_/_/C/1_/15_ (C15)	AS5400-5599
_/_/2_/15_ (215)	AD4000-4999
_/_/E/2_/15_ (E15)	AD5000-5199
_/_/F/2_/15_ (F15)	AD5200-5399
_/_/G/2_/15_ (G15)	AD5400-5599
_/_/3_/15_ (315)	AQ8000-8999
_/_/I/3_/15_ (I15)	AQ9000-9199
_/_/L/3_/15_ (L15)	AQ9200-9399
_/_/5_/15_ (515)	AD6000-6999
_/_/R/5_/15_ (R15)	AD7000-7199
_/_/S/5_/15_ (S15)	AD7200-7399
A/R/T/Y_/GRP (GRP)	AR3000-3999
_/_/K/3_/15_ (K15)	AR4000-4199
_/_/Q/5_/15_ (Q15)	AR5000-5199

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6. COMMANDER'S CRITERIA

Make the following modifications to the commander's criteria established in reference (a).

a. FM;MOD

<u>STATION</u>	<u>ASSIGNED ZONE</u>
F/S/C/6_/MD_ (6MD)	ZO16MD
D/A/S/6_/AW_ (6AW)	ZO16MD
F/S/C/3_/22_ (322)	ZO1322
F/S/C/4_/MR_ (4MR)	ZO14MR
F/S/C/1_/4_ (1A4)	ZO11A4
F/S/C/2_/4_ (2A4)	ZO12A4
F/S/C/3_/4_ (3A4)	ZO13A4
F/S/C/22/MR_ (22M)	ZO122M
F/S/C/1_/22_ (122)	ZO1122
F/S/C/2_/22_ (222)	ZO1222
F/S/C/3_/22_ (322)	ZO1322
F/S/C/29/MR_ (29M)	ZO129M
F/S/C/1_/29_ (129)	ZO1129
F/S/C/2_/29_ (229)	ZO1229
F/S/C/3_/22_ (322)	ZO1329
_/_/15/MR_ (15M)	ZO16MD
T/P/C/15/MR_ (15T)	ZO16MD
_/_A/6_/27_ (627)	ZO16MD
_/_/1_/15_ (115)	ZO12MR
_/_/2_/15_ (215)	ZO14MR
_/_/3_/15_ (315)	ZO16MD
_/_/5_/15_ (515)	ZO14MR
A/R/T/Y_/GRP (GRP)	ZO1TFS

ECOF: 0.3%

b. FM;FUSEL. As per reference (a).

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c. FM:ATTACK

<u>TARGET</u>	<u>EFFECTS</u>	<u>VOLLEYS</u>
CEN/DIV	10%	
RKTMSL/MDMMSL		4
SUPPLY/AMMO		3
SUPPLY/POL		3

d. FM:XCLUDE. As per reference (a).

e. Fire Planning. As per reference (a).

7. ARTILLERY TARGET INTELLIGENCE

a. Artillery Target Intelligence Reporting. The following will be reported in Artillery Target Intelligence (ATI) message formats:

(1) All enemy activity that is judged by the observer as likely to remain in place for at least two hours.

(2) FO fire missions that are denied will be entered as ATI messages if the target is likely to remain in place for at least two hours.

(3) All nominations to the target list will be reported into the system using ATI;CDRs with the altitude entered by the reporting agency.

b. ATI MOD FILE. Make the following modifications at the division FSCC and the 15th Marines TPC.

(1) ATI:FMMOD(a) Target Reports to be Considered

1 Division FSCC: All reports.

2 TPC: Solution reports only.

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(b) WTYP:31

(c) WSIZ:9

(d) WDOP:33

(e) RV:350

(2) ATI:SVMOD

(a) MAX REPORT AGE: 8 HRS

(b) MAX TIME DIFFERENCE: 2 HRS

(c) RPF:400

(d) QMOD:2.0

(e) DNARV:50

(3) ATI:DPMOD: As per reference (a).

(4) ATI:TBMOD: Targets constituting a buildup: 3.

8. BATTLEFIELD GEOMETRY

a. Current Support Data. Initial support data is provided in Enclosure 1 of this Tab.

b. Future Support Data. Future support data is entered in a plan name **FUTURE**. This data is disseminated as geometry of plan **FUTURE**. The responsible FSCC activates the measure by —

(1) Entering and transmitting a **SPRT;COMD** message deleting the current geometry by name.

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- (2) Entering and transmitting a **SPRT;CMD** using option **NEW FROM EXISTING** with the name of the specific geometry.

Each receiving station actions the **SPRT;CMD** messages to place the geometry into effect.

**9. AMMUNITION AND FIRING UNITS****a. Controlled Supply Rate:**

155MM: 300 rds/btry/day

105MM: 360 rds/btry/day

**b. Critical Ammunition Levels:****(1) 105mm**

HEA	HEC	HER
50	50	30

**(2) 155mm**

HEA	HEF	HER
50	50	30
50	50	30

**10. COMMUNICATIONS**

- a. Communications will be conducted in accordance with reference (a).
- b. The data guard chart and subscriber table are provided in Enclosures 2 and 3 of this Tab.

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**11. REPORTS**

- a. Battery FDC submit an **AFU;UPDATE** with **OUTTIL** immediately prior to displacement and a corrected **AFU;UPDATE** with **READY** when in place and guns are up.
- b. Battalion FDCs submit an **AFU;SR** to regimental FDC upon establishing a new COC and at 2300Z and 1400Z daily.

**ACKNOWLEDGE RECEIPT**

**BY COMMAND OF MAJOR GENERAL LEJEUNE**

**S. D. BUTLER**  
Colonel, U.S. Marine Corps  
Chief of Staff

**ENCLOSURES:**

- 1 - Initial Geometry
- 2 - Data Guard Chart
- 3 - Subscriber Table

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**ENCLOSURE 1 (Initial Geometry) to Tab J (Marine Corps Fire Support System Plan) to Appendix 12 (Fire Support) to Annex C (Operations) to Operations Order 1-94**

1. ZONES

## a. ZO16MD

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 650	47	2	027 650	47	3	069 649	47
4	079 651	47	5	785 655	48	6	847 649	48
7	864 653	48	8	865 610	48	9	863 568	48
10	864 515	48	11	866 469	48	12	858 413	48
13	850 389	48	14	790 396	48	15	205 389	47
16	113 393	47	17	080 391	47	18	070 390	47
19	038 391	47	20	BLANK		21	980 390	47

## b. ZO14MR

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 650	47	2	027 650	47	3	069 649	47
4	079 651	47	5	785 655	48	6	847 649	48
7	864 653	48	8	865 610	48	9	863 568	48
10	834 563	48	11	750 567	48	12	205 569	47
13	160 564	47	14	088 569	47	15	073 574	47
16	034 575	47	17	013 563	47	18	980 560	47

## c. ZO11A4

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 650	47	2	027 650	47	3	069 649	47
4	079 651	47	5	785 655	48	6	847 649	48
7	864 653	48	8	865 610	48	9	853 609	48
10	768 609	48	11	200 608	47	12	110 614	47
13	026 617	47	14	980 614	47			

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## d. ZO13A4

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 614	47	2	026 617	47	3	110 614	47
4	200 608	47	5	768 609	48	6	835 609	48
7	865 610	48	8	863 568	48	9	834 563	48
10	750 567	48	11	205 569	47	12	160 564	47
13	088 569	47	14	073 574	47	15	034 575	47
16	013 563	47	17	980 560	47			

## e. ZO122M

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 560	47	2	013 563	47	3	034 575	47
4	073 574	47	5	088 569	47	6	160 564	47
7	205 569	47	8	750 567	48	9	834 563	48
10	863 568	48	11	864 515	48	12	866 469	48
13	843 470	48	14	803 462	48	15	142 467	47
16	113 463	47	17	086 466	47	18	025 466	47
19	010 463	47	20	980 460	47			

## f. ZO1222

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 560	47	2	013 563	47	3	034 575	47
4	073 574	47	5	088 569	47	6	160 564	47
7	205 569	47	8	750 567	48	9	834 563	48
10	863 568	48	11	864 515	48	12	250 515	47
13	128 510	47	14	120 507	47	15	108 513	47
16	033 517	47	17	008 539	47	18	980 537	47

## g. ZO1322

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 537	47	2	008 539	47	3	033 517	47
4	108 513	47	5	120 507	47	6	128 510	47
7	250 515	47	8	264 515	48	9	866 469	48
10	843 470	48	11	803 462	48	12	142 467	47
13	113 463	47	14	086 466	47	15	025 466	47
16	010 463	47	17	980 460	47			

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## h. ZO1TFS

## ADJ ZONES:

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	980 460	47	2	010 463	47	3	025 466	47
4	086 466	47	5	113 463	47	6	142 467	47
7	803 462	48	8	843 470	48	9	866 469	48
10	858 413	48	11	850 389	48	12	790 396	48
13	205 389	47	14	113 393	47	15	080 391	47
16	070 390	47	17	038 391	47	18	980 390	47

2. FLOT

## a. FL14MR

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	027 650	47	2	030 631	47	5	030 628	47
6	029 615	47	13	029 613	47	14	038 590	47
15	038 589	47	16	034 574	47			

## b. FL122R

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
7	034 572	47	8	046 549	47	9	047 516	47
10	047 518	47	13	047 516	47	14	043 494	47
17	044 489	48	18	048 463	48			

## c. FL1TFS

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	046 463	47	2	045 444	47	3	048 427	47
4	048 463	47	5	044 391	47			

3. CFL

## a. CL14MR

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	068 650	47	2	052 623	47	3	065 575	47

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## b. CL122R

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	053 574	47	2	048 562	47	3	052 552	47
4	060 517	47	5	053 491	47	6	058 480	47
7	056 465	47						

## c. CL1TFS

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	055 465	47	2	058 455	47	3	054 438	47
4	061 416	47	5	056 391	47			

4. FSCL

## a. FS16MD

PT#	GRID	GZ	PT#	GRID	GZ
1	770 653	48	2	781 395	48

5. RFL

## a. RL16MD

PT#	GRID	GZ	PT#	GRID	GZ
1	104 444	47	2	121 423	47

6. RFA

## a. RF16MD (No WP)

PT#	GRID	GZ	PT#	GRID	GZ
1	200 575	47	2	210 575	47
3	220 560	47	4	200 560	47

7. NFA

## a. NF16MD

PT#	GRID	GZ	RADIUS
1	197 410	47	1000

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**UNCLASSIFIED****8. FFA****a. FF16AW**

PT#	GRID	GZ	PT#	GRID	GZ	PT#	GRID	GZ
1	790 454	48	2	777 427	48	3	798 405	48

**9. PHASE LINES****a. PLBLUE**

PT#	GRID	GZ	PT#	GRID	GZ
1	069 650	47	2	070 390	47

**b. PLRED**

PT#	GRID	GZ	PT#	GRID	GZ
1	115 393	47	2	113 660	47

**c. PLGRN**

PT#	GRID	GZ	PT#	GRID	GZ
1	151 390	47	2	189 460	47
3	199 506	47	4	211 564	47
5	230 650	47			

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**ENCLOSURE 2 (Data Guard Chart) to Tab J (Marine Corps Fire Support System Plan) to Appendix 12 (Fire Support) to Annex C (Operations) to Operations Order 1-94**

<b>Legend:</b> C=Net Control X=Guard A=As Required W=When Directed R=Relay	6MF MEF FFC NET	6MD DIV FSC NET	4MR REGT FSC NET	22M REGT FSC NET	29M REGT FSC NET	TFS REGT FSC NET	15M REGT FD2 NET	TPC WIRE NET	TPC MET/RDR TEL NET	115 COF A	115 COF B	215 COF A	215 COF B	315 COF A	315 COF B	515 COF A	515 COF B	GRP COF A	GRP COF B
Keytime	0.7	0.7	0.7	2.1	2.1	1.4	0.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
FSK 1=12/24 2=13/21 D=digital	D	D	D	1	1	D	D	1	1	1	1	1	1	1	1	1	1	2	2
BLK MODE				1	1			1	1	1	1	1	1	1	1	1	1	1	1
Data Rate (bps)	4800	4800	4800	1200	1200	4800	4800	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
COM- SEC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6MF FFCC	C																		
6MD FSCC	X	C						R											
6AW DASC		X																	

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Legend: C=Net Control X=Guard A=As Required W=When Directed R=Relay	6MF MEF FFC NET	6MD DIV FSC NET	4MR REGT FSC NET	22M REGT FSC NET	29M REGT FSC NET	TFS REGT FSC NET	15M REGT FD2 NET	TPC WIRE NET	TPC MET/RDR TEL NET	115 COF A	115 COF B	215 COF A	215 COF B	315 COF A	315 COF B	515 COF A	515 COF B	GRP COF A	GRP COF B
4MR FSCC		X	C					R											
1A4 FSC+FOs			X									X							
2A4 FSC+FOs			X 1									X							
3A4 FSC+FOs			X 1										X						
22M FSCC	X	X		C				R											
122 FSC+FOs				X 1						X									
222 FSC+FOs				X 1						X									
322 FSC+FOs				X 1							X								
29M FSCC		X			C			R											
229 FSC+FOs					X 1														
329 FSC+FOs					X 1														
TFS FSCC		X				C		R											
129 FSC+FOs						X 1												X	
6LA FSC+FOs						X 1													X

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Legend: C=Net Control X=Guard A=As Required W=When Directed R=Relay	6MF MEF FFC NET	6MD DIV FSC NET	4MR REGT FSC NET	22M REGT FSC NET	29M REGT FSC NET	TFS REGT FSC NET	15M REGT FD2 NET	TPC WIRE NET	TPC MET/RDR TEL NET	115 COF A	115 COF B	215 COF A	215 COF B	315 COF A	315 COF B	515 COF A	515 COF B	GRP COF A	GRP COF B
15M FDC		X					C	C											
15M TPC		R					R	X	C										
15M MET									X										
15M RADAR									X										
UAV									X										
115 FDC				X			X			C	C								
A15 FDC										X									
B15 FDC										X									
C15 FDC											X								
215 FDC			X				X					C	C						
E15 FDC												X							
F15 FDC												X							
G15 FDC													X						
315 FDC							X							C	C	C			

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Legend: C=Net Control X=Guard A=As Required W=When Directed R=Relay	6MF MEF FFC NET	6MD DIV FSC NET	4MR REGT FSC NET	22M REGT FSC NET	29M REGT FSC NET	TFS REGT FSC NET	15M REGT FD2 NET	TPC WIRE NET	TPC MET/RDR TEL NET	115 COF A	115 COF B	215 COF A	215 COF B	315 COF A	315 COF B	515 COF A	515 COF B	GRP COF B	GRP COF A
I15 FDC														X					
L15 FDC															X	X			
515 FDC							X									C	C		
R15 FDC																X			
S15 FDC																	X		
GRP FDC							X											C	C
K15 FDC																		X	
Q15 FDC																			X
A27 FDC							X												

NOTE 1: Battalion FSCC only.

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**ENCLOSURE 3 (Subscriber Table) to Tab J (Marine Corps Fire Support System Plan) to Appendix 12 (Fire Support) to Annex C (Operations) to Operations Order 1-94**

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
10	F/F/C/6_/MF	MEF FFC	1_/2_/2_/3_	A	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
11	MEF FFC	F/W/D/6_/MEF	BN FDC	I	I	4M/M4	OTHER	
12		_/_/_/6_/MD_	BN FDC	B	B	5M/M6	OTHER	
13		F/W/D/6_/DIV	BN FDC	C	C	6M/M6	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
14	D/A/S/6_/AW_	DIV FSC	2_/3_/3_/4_	2	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
15	DIV FSC	D/A/S/6_/FWD	BN FDC	3	3	V4/4V	OTHER	
16		F/S/C/6_/MD_	BN FDC	0	0	0S/S0	OTHER	
17		F/W/D/6_/DIV	BN FDC	1	1	1T/T1	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
18	F/S/C/6_/MD_	DIV FSC	1_/2_/2_/3_	0	N/A			
19	F/S/C/6_/MD_	MEF FFC	2_/3_/3_/4_	B	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
20	DIV FSC	F/W/D/6_/DIV	BN FDC	1	1	C0/0C	OTHER	
21		D/A/S/6_/AW_	BN FDC	2	2	S0/0S	OTHER	
22		D/A/S/6_/FWD	BN FDC	3	3	U2/2U	OTHER	
23		F/S/C/4_/MR_	BN FDC	4	4	D1/1D	OTHER	
24		F/W/D/4_/MAR	BN FDC	5	5	D2/2D	OTHER	
25		F/S/C/22/MR_	BN FDC	6	6	D3/3D	OTHER	
26		F/W/D/22/MAR	BN FDC	7	7	D4/4D	OTHER	
27		F/S/C/29/MR_	BN FDC	8	8	D5/5D	OTHER	
28		F/W/D/29/MAR	BN FDC	?	?	D6/6D	OTHER	
29		T/F/S/1_/MN_	BN FDC	+	+	ES/SE	OTHER	
30		T/F/S/1_/FW_	BN FDC	.	.	FK/KF	OTHER	
31		_/_/_/15/MR_	BN FDC	9	9	Q8/8Q	OTHER	
32		F/W/D/15/MAR	BN FDC	*	*	R9/9R	OTHER	

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
33		T/P/C/15/MR_	RELAY/ BN FDC	9	9		OTHER	
34		F/W/D/15/TPC	RELAY/ BN FDC	9	9		OTHER	
35	MEF FFC	F/F/C/6_/MF_	BN FDC	A	A	M5/5M	OTHER	
36		F/W/D/6_/MEF	BN FDC	I	I	N3/3N	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
37	F/S/C/4_/MR_	DIV FSC	2_/3_/3_/4_	4	N/A
38	F/S/C/4_/MR_	REGT FSC	1_/2_/2_/3_	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
39	DIV FSC	F/S/C/6_/MD_	BN FDC	0	0	1D/D1	OTHER	
40		F/W/D/6_/DIV	BN FDC	1	1	7D/D7	OTHER	
41		D/A/S/6_/AW_	BN FDC	2	2	T2/2T	OTHER	
42		D/A/S/6_/FWD	BN FDC	3	3	U4/4U	OTHER	
43		F/S/C/22/MR_	BN FDC	6	6	E4/4E	OTHER	
44		F/W/D/22/MAR	BN FDC	7	7	E5/5E	OTHER	
45		F/S/C/29/MR_	BN FDC	8	8	E6/6E	OTHER	
46		F/W/D/29/MAR	BN FDC	?	?	E7/7E	OTHER	
47		T/F/S/1_/MN_	BN FDC	+	+	EU/UE	OTHER	
48		T/F/S/1_/FW_	BN FDC	.	.	FM/MF	OTHER	
49		_/_/15/MR_	BN FDC	9	9	R1/1R	OTHER	
50		F/W/D/15/MAR	BN FDC	*	*	S1/1S	OTHER	
51	REGT FSC	F/W/D/4_/MAR	BN FDC	B	B	F8/8F	OTHER	
52		F/S/C/1_/4_	BN FDC	C	C	G1/1G	OTHER	
53		F/W/D/1_/4MR	BN FDC	D	D	G2/2G	OTHER	
54		F/S/C/2_/4_	BN FDC	E	E	G3/3G	OTHER	
55		F/W/D/2_/4MR	BN FDC	F	F	G4/4G	OTHER	
56		F/S/C/3_/4_	BN FDC	G	G	G5/5G	OTHER	
57		F/W/D/3_/4MR	BN FDC	H	H	G6/6G	OTHER	
58		_/_/2_/15_	BN FDC	I	I	F9/9F	OTHER	
59		F/W/D/2_/15M	BN FDC	J	J	F0/0F	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
60	F/S/C/22/MR_	DIV FSC	2_/3_/3_/4_	6	N/A
61	F/S/C/22/MR_	REGT FSC	1_/2_/2_/3_	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
62	DIV FSC	F/S/C/6_/MD_	BN FDC	0	0	3D/D3	OTHER	
63		F/W/D/6_/DIV	BN FDC	1	1	9D/D9	OTHER	
64		D/A/S/6_/AW_	BN FDC	2	2	T4/4T	OTHER	
65		D/A/S/6_/FWD	BN FDC	3	3	U6/6U	OTHER	
66		F/S/C/4_/MR_	BN FDC	4	4	4E/E4	OTHER	
67		F/W/D/4_/MAR	BN FDC	5	5	8E/E8	OTHER	
68		F/S/C/29/MR_	BN FDC	8	8	F3/3F	OTHER	
69		F/W/D/29/MAR	BN FDC	?	?	F4/4F	OTHER	
70		T/F/S/1_/MN_	BN FDC	+	+	FG/GF	OTHER	

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
71		T/F/S/1_/FW_	BN FDC	.	.	FO/OF	OTHER	
72		_/_/_/15/MR_	BN FDC	9	9	R3/3R	OTHER	
73		FW/D/15/MAR	BN FDC	*	*	S3/3S	OTHER	
74	REGT FSC	FW/D/22/MAR	BN FDC	B	B	F8/8F	OTHER	
75		F/S/C/1_/22_	BN FDC	C	C	G1/1G	OTHER	
76		FW/D/1_/22M	BN FDC	D	D	G2/2G	OTHER	
77		F/S/C/2_/22_	BN FDC	E	E	G3/3G	OTHER	
78		FW/D/2_/22M	BN FDC	F	F	G4/4G	OTHER	
79		F/S/C/3_/22_	BN FDC	G	G	G5/5G	OTHER	
80		FW/D/3_/22M	BN FDC	H	H	G6/6G	OTHER	
81		_/_/_/1_/15_	BN FDC	I	I	F9/9F	OTHER	
82		FW/D/1_/15M	BN FDC	J	J	F0/0F	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
83	F/S/C/29/MR_	DIV FSC	2_/3_/3_/4_	8	N/A
84	F/S/C/29/MR_	REGT FSC	1_/2_/2_/3_	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
85	DIV FSC	F/S/C/6_/MD_	BN FDC	0	0	5D/D5	OTHER	
86		FW/D/6_/DIV	BN FDC	1	1	1E/E1	OTHER	
87		D/A/S/6_/AW_	BN FDC	2	2	T6/6T	OTHER	
88		D/A/S/6_/FWD	BN FDC	3	3	U8/8U	OTHER	
89		F/S/C/4_/MR_	BN FDC	4	4	6E/E6	OTHER	
90		FW/D/4_/MAR	BN FDC	5	5	0E/E0	OTHER	
91		F/S/C/22/MR_	BN FDC	6	6	3F/F3	OTHER	
92		FW/D/22/MAR	BN FDC	7	7	5F/F5	OTHER	
93		T/F/S/1_/MN_	BN FDC	+	+	F1/IF	OTHER	
94		T/F/S/1_/FW_	BN FDC	.	.	FQ/QF	OTHER	
95		_/_/_/15/MR_	BN FDC	9	9	R5/5R	OTHER	
96		FW/D/15/MAR	BN FDC	*	*	S6/6S	OTHER	
97	REGT FSC	FW/D/29/MAR	BN FDC	B	B	F8/8F	OTHER	
98		F/S/C/2_/29_	BN FDC	E	E	G1/1G	OTHER	
99		FW/D/2_/29M	BN FDC	F	F	G2/2G	OTHER	
100		F/S/C/3_/29_	BN FDC	G	G	G3/3G	OTHER	
101		FW/D/3_/29M	BN FDC	H	H	G4/4G	OTHER	
102		_/_/_/1_/15_	BN FDC	I	I	F9/9F	OTHER	
103		FW/D/1_/15M	BN FDC	J	J	F0/0F	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
104	T/F/S/1_/MN_	DIV FSC	2_/3_/3_/4_	+	N/A
105	T/F/S/1_/MN_	REGT FSC	1_/2_/2_/3_	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
106	DIV FSC	F/S/C/6_/MD_	BN FDC	0	0	SE/ES	OTHER	
107		FW/D/6_/DIV	BN FDC	1	1	TE/ET	OTHER	
108		D/A/S/6_/AW_	BN FDC	2	2	T8/8T	OTHER	
109		D/A/S/6_/FWD	BN FDC	3	3	U0/0U	OTHER	
110		F/S/C/4_/MR_	BN FDC	4	4	UE/EU	OTHER	

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
111		F/W/D/4_/MAR	BN FDC	5	5	VE/EV	OTHER	
112		F/S/C/22/MR_	BN FDC	6	6	GF/FG	OTHER	
113		F/W/D/22/MAR	BN FDC	7	7	HF/FH	OTHER	
114		F/S/C/29/MR_	BN FDC	8	8	IF/FI	OTHER	
115		F/W/D/29/MAR	BN FDC	?	?	JF/FJ	OTHER	
116		_/_/_/15/MR_	BN FDC	9	9	R7/7R	OTHER	
117		F/W/D/15/MAR	BN FDC	*	*	S7/7S	OTHER	
118	REGT FSC	T/F/S/1_/FWD	BN FDC	B	B	F8/8F	OTHER	
119		F/S/C/1_/29_	BN FDC	C	C	G1/1G	OTHER	
120		F/W/D/1_/29M	BN FDC	D	D	G2/2G	OTHER	
121		F/S/C/6_/LAJ	BN FDC	E	E	G3/3G	OTHER	
122		F/W/D/6_/LAJ	BN FDC	F	F	G4/4G	OTHER	
123		A/R/T/Y_/GRP	BN FDC	I	I	F9/9F	OTHER	
124		A/R/T/Y_/FWD	BN FDC	J	J	F0/0F	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
125	F/S/C/1_/4_	REGT FSC	2_/3_/3_/4_	C	N/A
126	F/S/C/1_/4_	COF A	2_/3_/3_/4_		N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
127	REGT FSC	F/W/D/1_/4MR	BN FDC	D	D	J6/6J	OTHER	
128		F/S/C/4_/MR_	BN FDC	A	A	1G/G1	OTHER	
129		F/W/D/4_/MAR	BN FDC	B	B	1H/H1	OTHER	
130		F/S/C/2_/4_	BN FDC	E	E	K3/3K	OTHER	
131		F/W/D/2_/4MR	BN FDC	F	F	K4/4K	OTHER	
132		F/S/C/3_/4_	BN FDC	G	G	K5/5K	OTHER	
133		F/W/D/3_/4MR	BN FDC	H	H	K6/6K	OTHER	
134	COF A	_/_/_/2_/15_	BN FDC	A	A	5M/M5	OTHER	
135		F/W/D/2_/15M	BN FDC	B	B	3N/N3	OTHER	
136		F/O/A/41/_	BN FDC	E		O4/4O	FOWOL	
137		F/O/B/42/_	BN FDC	F		O5/5O	FOWOL	
138		F/O/C/43/_	BN FDC	G		O6/6O	FOWOL	
139		_/_/_/2_/15_	BCS	I	I	O2/2O	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
140	F/S/C/3_/4_	REGT FSC	2_/3_/3_/4_	G	N/A
141	F/S/C/3_/4_	COF B	_/_/_/_/_		N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
142	REGT FSC	F/W/D/3_/4MR	BN FDC	H	H	F8/8F	OTHER	
143		F/S/C/4_/MR_	BN FDC	A	A	G1/1G	OTHER	
144		F/W/D/4_/MAR	BN FDC	B	B	G2/2G	OTHER	
145		F/S/C/1_/4_	BN FDC	C	C	G3/3G	OTHER	
146		F/W/D/1_/4MR	BN FDC	D	D	G4/4G	OTHER	
147		F/S/C/2_/4_	BN FDC	E	E	G5/5G	OTHER	
148		F/W/D/2_/4MR	BN FDC	F	F	G6/6G	OTHER	
149	COF B	_/_/_/2_/15_	BN FDC	A	A	5V/V5	OTHER	
150		F/W/D/1_/15M	BN FDC	B	B	DA/AD	OTHER	

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
151		F/O/I/47/	DMD	E		AO/OA	FOWOL	
152		F/O/K/48/	DMD	F		AP/PA	FOWOL	
153		F/O/L/49/	DMD	G		AQ/QA	FOWOL	
154		_/_G/2/_15_	BCS	I	I	AM/MA	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
155	F/S/C/2_/_22_	REGT FSC	2_/_3_/_3_/_4_	E	N/A
156	F/S/C/2_/_22_	COF A	2_/_3_/_3_/_4_	C	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
157	REGT FSC	F/W/D/2_/_22M	BN FDC	F	F	K9/9K	OTHER	
158		F/S/C/22/MR_	BN FDC	A	A	3G/G3	OTHER	
159		F/W/D/22/MAR	BN FDC	B	B	3H/H3	OTHER	
160		F/S/C/1_/_22_	BN FDC	C	C	7J/J7	OTHER	
161		F/W/D/1_/_22M	BN FDC	D	D	3K/K3	OTHER	
162		F/S/C/3_/_22_	BN FDC	G	G	K0/0K	OTHER	
163		F/W/D/3_/_22M	BN FDC	H	H	L1/1L	OTHER	
164	COF A	_/_/_1_/_15_	BN FDC	A	A	0Q/Q0	OTHER	
165		F/W/D/1_/_15M	BN FDC	B	B	8R/R8	OTHER	
166		F/O/E/24/	DMD	M		S9/9S	FOWOL	
167		F/O/F/25/	DMD	N		S0/0S	FOWOL	
168		F/O/G/26/	DMD	O		T1/1T	FOWOL	
169		_/_/B/1_/_15_	BCS	0	0	T3/3T	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
170	F/S/C/3_/_22_	REGT FSC	2_/_3_/_3_/_4_	G	N/A
171	F/S/C/3_/_22_	COF B	_/_/_/_/_		N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
172	REGT FSC	F/W/D/3_/_22M	BN FDC	H	H	L8/8L	OTHER	
173		F/S/C/22/MR_	BN FDC	A	A	5G/G5	OTHER	
174		F/W/D/22/MAR	BN FDC	B	B	5H/H5	OTHER	
175		F/S/C/1_/_22_	BN FDC	C	C	9J/J9	OTHER	
176		F/W/D/1_/_22M	BN FDC	D	D	5K/K5	OTHER	
177		F/S/C/2_/_22_	BN FDC	E	E	0K/K0	OTHER	
178		F/W/D/2_/_22M	BN FDC	F	F	4L/L4	OTHER	
179	COF B	_/_/_1_/_15_	BN FDC	A	C	5V/V5	OTHER	
180		F/W/D/1_/_15M	BN FDC	B	D	DA/AD	OTHER	
181		F/O/N/27/	DMD	E		AO/OA	FOWOL	
182		F/O/K/28/	DMD	F		AP/PA	FOWOL	
183		F/O/L/29/	DMD	G		AQ/QA	FOWOL	
184		_/_/C/1_/_15_	BCS	I	I	AM/MA	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
185	F/S/C/1_/_29_	REGT FSC	2_/_3_/_3_/_4_	C	N/A
186	F/S/C/1_/_29_	COF A	2_/_3_/_3_/_4_	C	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
187	REGT FSC	F/W/D/1_/29M	BN FDC	D	D	J6/6J	OTHER	
188		T/F/S/1_/MN_	BN FDC	A	A	1G/G1	OTHER	
189		T/F/S/1_/FWD	BN FDC	B	B	1H/H1	OTHER	
190		F/S/C/6_/LAI	BN FDC	E	E	J7/J7	OTHER	
191		F/W/D/6_/LAI	BN FDC	F	F	J8/J8	OTHER	
192	COF A	A/R/T/Y_/GRP	BN FDC	A	A	5M/M5	OTHER	
193		A/R/T/Y_/FWD	BN FDC	B	B	3N/N3	OTHER	
194		F/O/A/91/	DMD	E		O4/4O	FOWOL	
195		F/O/B/92/	DMD	F		O5/5O	FOWOL	
196		F/O/C/93/	DMD	G		O6/6O	FOWOL	
197		_/_/K/3_/15_	BCS	I	I	O2/2O	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
198	F/S/C/6_/LAI	REGT FSC	2_/3_/3_/4_	E	N/A
199	F/S/C/6_/LAI	COF B	_/_/_/_/_		N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
200	REGT FSC	F/W/D/6_/LAI	BN FDC	F	F	K9/9K	OTHER	
201		T/F/S/1_/MN_	BN FDC	A	A	3G/G3	OTHER	
202		T/F/S/1_/FWD	BN FDC	B	B	3H/H3	OTHER	
203		F/S/C/1_/29_	BN FDC	C	C	7J/J7	OTHER	
204		F/W/D/1_/29M	BN FDC	D	D	3K/K3	OTHER	
205	COF B	A/R/T/Y_/GRP	BN FDC	A	A	0Q/Q0	OTHER	
206		A/R/T/Y_/FWD	BN FDC	B	B	8R/R8	OTHER	
207		F/O/A/61/	DMD	E		S8/8S	FOWOL	
208		F/O/B/62/	DMD	F		S9/9S	FOWOL	
209		F/O/C/49/	DMD	G		S0/0S	FOWOL	
210		_/_/Q/5_/15_	BCS	I	I	S7/7S	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
211	F/O/A/21/	COF A	4	E	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
212	COF A	_/_/_/1_/15_	Y	A				
213		F/W/D/1_/15M	Y	B				
214		F/S/C/1_/22_	Y	C				
215		F/W/D/1_/22M	Y	D				
216		_/_/A/1_/15_	Y	I				
217		F/O/B/22/	N	F				
218		F/O/C/23/	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
219	F/O/B/22/	COFA	4	F	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
220	COF A	_/_/_/1/_/15_	Y	A				
221		F/W/D/1/_/15M	Y	B				
222		F/S/C/1/_/22_	Y	C				
223		F/W/D/1/_/22M	Y	D				
224		_/_/A/1/_/15_	Y	I				
225		F/O/A/21/_/___	N	E				
226		F/O/C/23/_/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
227	F/O/C/23/_/___	COF A	4	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
228	COF A	_/_/_/1/_/15_	Y	A				
229		F/W/D/1/_/15M	Y	B				
230		F/S/C/1/_/22_	Y	C				
231		F/W/D/1/_/22M	Y	D				
232		_/_/A/1/_/15_	Y	I				
233		F/O/A/21/_/___	N	E				
234		F/O/B/22/_/___	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
235	F/O/E/24/_/___	COF A	4	M	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
236	COF A	_/_/_/1/_/15_	Y	A				
237		F/W/D/1/_/15M	Y	B				
238		F/S/C/2/_/22_	Y	K				
239		F/W/D/2/_/22M	Y	L				
240		_/_/B/1/_/15_	Y	O				
241		F/O/F/25/_/___	N	N				
242		F/O/G/26/_/___	N	O				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
243	F/O/F/25/_/___	COF A	4	M	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
244	COF A	_/_/_/1/_/15_	Y	A				
245		F/W/D/1/_/15M	Y	B				
246		F/S/C/2/_/22_	Y	K				
247		F/W/D/2/_/22M	Y	L				
248		_/_/B/1/_/15_	Y	O				
249		F/O/E/24/_/___	N	M				
250		F/O/G/26/_/___	N	O				

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LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
251	F/O/G/26/___	COF A	4	O	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
252	COF A	_/_/_/1/_/15_	Y	A				
253		F/W/D/1/_/15M	Y	B				
254		F/S/C/2/_/22_	Y	K				
255		F/W/D/2/_/22M	Y	L				
256		_/_/B/1/_/15_	Y	O				
257		F/O/E/24/___	N	M				
258		F/O/F/25/___	N	N				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
259	F/O/I/27/___	COF B	4	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
260	COF B	_/_/_/1/_/15_	Y	A				
261		F/W/D/1/_/15M	Y	B				
262		F/S/C/3/_/22_	Y	C				
263		F/W/D/3/_/22M	Y	D				
264		_/_/C/1/_/15_	Y	I				
265		F/O/K/28/___	N	F				
266		F/O/L/29/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
267	F/O/K/28/___	COF B	4	F	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
268	COF B	_/_/_/1/_/15_	Y	A				
269		F/W/D/1/_/15M	Y	B				
270		F/S/C/3/_/22_	Y	C				
271		F/W/D/3/_/22M	Y	D				
272		_/_/C/1/_/15_	Y	I				
273		F/O/I/27/___	N	E				
274		F/O/L/29/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
275	F/O/L/29/___	COF B	4	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
276	COF B	_/_/_/1/_/15_	Y	A				
277		F/W/D/1/_/15M	Y	B				
278		F/S/C/3/_/22_	Y	C				
279		F/W/D/3/_/22M	Y	D				
280		_/_/C/1/_/15_	Y	I				

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
281		F/O/I/27/___	N	E				
282		F/O/K/28/___	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
283	F/O/A/41/___	COF A	4	E	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
284	COF A	/ / /2 /15_	Y	A				
285		F/W/D/2 /15M	Y	B				
286		F/S/C/1 /4_	Y	C				
287		F/W/D/1 /4MR	Y	D				
288		/ /E/2 /15_	Y	0				
289		F/O/B/42/___	N	F				
290		F/O/C/43/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
291	F/O/B/42/___	COF A	4	F	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
292	COF A	/ / /2 /15_	Y	A				
293		F/W/D/2 /15M	Y	B				
294		F/S/C/1 /4_	Y	C				
295		F/W/D/1 /4MR	Y	D				
296		/ /E/2 /15_	Y	0				
297		F/O/A/41/___	N	E				
298		F/O/C/43/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
299	F/O/C/43/___	COF A	4	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
300	COF A	/ / /2 /15_	Y	A				
301		F/W/D/2 /15M	Y	B				
302		F/S/C/1 /4_	Y	C				
303		F/W/D/1 /4MR	Y	D				
304		/ /E/2 /15_	Y	0				
305		F/O/A/41/___	N	E				
306		F/O/B/42/___	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
307	F/O/I/47/___	COF A	3	E	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
308	COF A	/ / /2 /15	Y	A				
309		F/W/D/2 /15M	Y	B				
310		F/S/C/3 /4	Y	C				
311		F/W/D/3 /4MR	Y	D				
312		/ /G/2 /15	Y	I				
313		F/O/K/48/	N	F				
314		F/O/L/49/	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
315	F/O/K/48/	COF A	3	F	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
316	COF A	/ / /2 /15	Y	A				
317		F/W/D/2 /15M	Y	B				
318		F/S/C/3 /4	Y	C				
319		F/W/D/3 /4MR	Y	D				
320		/ /G/2 /15	Y	I				
321		F/O/I/47/	N	E				
322		F/O/L/49/	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
323	F/O/L/49/	COF A	3	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
324	COF A	/ / /2 /15	Y	A				
325		F/W/D/2 /15M	Y	B				
326		F/S/C/3 /4	Y	C				
327		F/W/D/3 /4MR	Y	D				
328		/ /G/2 /15	Y	I				
329		F/O/I/47/	N	E				
330		F/O/K/48/	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
331	F/O/A/61/	COF B	4	E	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
331	COF B	A/R/T/Y /GRP	Y	A				
332		A/R/T/Y /FWD	Y	B				
333		F/S/C/6 /LAI	Y	C				
334		F/W/D/6 /LAI	Y	D				
335		/ /Q/5 /15	Y	I				
336		F/O/B/62/	N	F				
337		F/O/C/63/	N	G				

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## UNCLASSIFIED

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
338	F/O/B/62/___	COF B	4	F	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
339	COF B	A/R/T/Y_/GRP	Y	A				
340		A/R/T/Y_/FWD	Y	B				
341		F/S/C/6_/LAI	Y	C				
342		F/W/D/6_/LAI	Y	D				
343		_/_/Q/5_/15_	Y	I				
344		F/O/A/61/___	N	E				
345		F/O/C/63/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
346	F/O/C/63/___	COF B	4	F	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
347	COF B	A/R/T/Y_/GRP	Y	A				
348		A/R/T/Y_/FWD	Y	B				
349		F/S/C/6_/LAI	Y	C				
350		F/W/D/6_/LAI	Y	D				
351		_/_/Q/5_/15_	Y	I				
352		F/O/A/61/___	N	E				
353		F/O/B/62/___	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
354	F/O/A/91/___	COF A	4	E	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
355	COF A	A/R/T/Y_/GRP	Y	A				
356		A/R/T/Y_/FWD	Y	B				
357		F/S/C/1_/29_	Y	C				
358		F/W/D/1_/29M	Y	D				
359		_/_/K/3_/15_	Y	I				
360		F/O/B/92/___	N	F				
361		F/O/C/93/___	N	G				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD			
362	F/O/B/92/___	COF A	4	F	N/A			

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
363	COF A	A/R/T/Y_/GRP	Y	A				
364		A/R/T/Y_/FWD	Y	B				
365		F/S/C/1_/29_	Y	C				
366		F/W/D/1_/29M	Y	D				
367		_/_/K/3_/15_	Y	I				
368		F/O/A/91/___	N	E				
369		F/O/C/93/___	N	G				

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## UNCLASSIFIED

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
370	F/O/C/93/	COF A	4	G	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
371	COF A	A/R/T/Y_/GRP	Y	A				
372		A/R/T/Y_/FWD	Y	B				
373		F/S/C/1_/29	Y	C				
374		F/W/D/1_/29M	Y	D				
375		_/_/K/3_/15	Y	I				
376		F/O/A/91/	N	E				
377		F/O/B/92/	N	F				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
378	_/_/_/15/MR	DIV FSC	2_/3_/3_/4	9	N/A
379	_/_/_/15/MR	REGT FD	1_/2_/2_/3	A	N/A
380	_/_/_/15/MR	TPC WIRE	1_/2_/2_/3	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
381	DIV FSC	F/S/C/6_/MD	BN FDC	0	0	9Q/Q9	OTHER	
382		F/W/D/6_/DIV	BN FDC	1	1	0Q/Q0	OTHER	
383		D/A/S/6_/AW	BN FDC	2	2	T0/T0	OTHER	
384		D/A/S/6_/FWD	BN FDC	3	3	V2/V2	OTHER	
385		F/S/C/4_/MR	BN FDC	4	4	1R/R1	OTHER	
386		F/W/D/4_/MAR	BN FDC	5	5	2R/R2	OTHER	
387		F/S/C/22/MR	BN FDC	6	6	3R/R3	OTHER	
388		F/W/D/22/MAR	BN FDC	7	7	4R/R4	OTHER	
389		F/S/C/29/MR	BN FDC	8	8	5R/R5	OTHER	
390		F/W/D/29/MAR	BN FDC	?	?	6R/R6	OTHER	
391		T/F/S/1_/MN	BN FDC	+	+	7R/R7	OTHER	
392		T/F/S/1_/FWD	BN FDC	.	.	8R/R8	OTHER	
393	REGT FD	F/W/D/15/MAR	BN FDC	B	B	AA/BB	OTHER	
394		_/_/_/1_/15	BN FDC	C	C	CC/DD	OTHER	
395		F/W/D/1_/15M	BN FDC	D	D	EE/FF	OTHER	
396		_/_/_/2_/15	BN FDC	E	E	GG/HH	OTHER	
397		F/W/D/2_/15M	BN FDC	F	F	II/JJ	OTHER	
398		_/_/_/3_/15	BN FDC	G	G	KK/LL	OTHER	
399		F/W/D/3_/15M	BN FDC	H	H	MM/ES	OTHER	
400		_/_/_/5_/15	BN FDC	I	I	OO/PP	OTHER	
401		F/W/D/5_/15M	BN FDC	J	J	99/00	OTHER	
402		A/R/T/Y_/GRP	BN FDC	K	K	GI/IG	OTHER	
403		A/R/T/Y_/FWD	BN FDC	L	L	GJ/JG	OTHER	
404		_/_/A/6_/27	MLRS	M	M	GK/KG	OTHER	
405	TPC WIRE	T/P/C/15/MR	BN FDC	J	J	ME/EM	OTHER	
406		F/W/D/15/TPC	BN FDC	K	K	PE/EP	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
407	T/P/C/15/MR	TPC WIRE	2_/3_/3_/4	J	N/A
408	T/P/C/15/MR	MET/RDR TEL	1_/2_/2_/3	J	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
409	TPC WIRE	F/S/C/6_/MD_	RELAY/ BN FDC	A	A		OTHER	
410		F/W/D/6_/DIV	RELAY/ BN FDC	A	A		OTHER	
411		_/_/_/15/MR_	BN FDC	A	A	EM/ME	OTHER	
412		F/W/D/15/MAR	BN FDC	B	B	EO/OE	OTHER	
413	MET/RDR TEL	C/M/R/01/_	Q-36	L		ET/TE	OTHER	
414		C/M/R/02/_	Q-36	M		EU/UE	OTHER	
415		C/M/R/03/_	Q-36	N		EV/VE	OTHER	
416		C/M/R/04/_	Q-36	O		FG/GF	OTHER	
417		M/D/S/01/_	MDS	1		FH/HF	OTHER	
418		M/D/S/02/_	MDS	2		FI/IF	OTHER	
419		M/D/S/03/_	MDS	3		FJ/JF	OTHER	
420		M/D/S/04/_	MDS	4		FK/KF	OTHER	
421		U/A/V/09/_	DMD	7		UV/VU	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
422	_/_/_/1_/15_	REGT FSC	2_/3_/3_/4_	I	N/A
423	_/_/_/1_/15_	REGT FD	2_/3_/3_/4_	C	N/A
424	_/_/_/1_/15_	COF A	1_/2_/2_/3_	A	N/A
425	_/_/_/1_/15_	COF B	1_/2_/2_/3_	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
426	REGT FSC	F/S/C/22/MR_	BN FDC	A	A	9F/F9	OTHER	
427		F/W/D/22/MAR	BN FDC	B	B	9G/G9	OTHER	
428	REGT FD	F/W/D/1_/15M	BN FDC	D	D	A2/2A	OTHER	
429		_/_/_/15/MR_	BN FDC	A	A	DD/CC	OTHER	
430		F/W/D/15/MAR	BN FDC	B	B	RR/QQ	OTHER	
431		_/_/_/2_/15_	BN FDC	E	E	A3/3A	OTHER	
432		F/W/D/2_/15M	BN FDC	F	F	A4/4A	OTHER	
433		_/_/_/3_/15_	BN FDC	G	G	A5/5A	OTHER	
434		F/W/D/3_/15M	BN FDC	H	H	A6/6A	OTHER	
435		_/_/_/5_/15_	BN FDC	I	I	A7/7A	OTHER	
436		F/W/D/5_/15M	BN FDC	J	J	A8/8A	OTHER	
437		A/R/T/Y_/GRP	BN FDC	K	K	GL/LG	OTHER	
438		A/R/T/Y_/FWD	BN FDC	L	L	GM/MG	OTHER	
439		_/_/A/6_/27_	MLRS	M	M	GN/NG	OTHER	
440	COF A	F/S/C/1_/22_	BN FDC	C	C	M5/5M	OTHER	
441		F/W/D/1_/22M	BN FDC	D	D	M6/6M	OTHER	
442		F/O/A/21/_	DMD	E		M9/9M	FOWOL	
443		F/O/B/22/_	DMD	F		M0/0M	FOWOL	
444		F/O/C/23/_	DMD	G		N1/1N	FOWOL	
445		_/_/A/1_/15_	BCS	I	I	M7/7M	OTHER	
446		F/S/C/2_/22_	BN FDC	K	K	Q0/0Q	OTHER	
447		F/W/D/2_/22M	BN FDC	L	L	R1/1R	OTHER	
448		F/O/E/24/_	DMD	M		R4/4R	FOWOL	
449		F/O/F/25/_	DMD	N		R5/5R	FOWOL	
450		F/O/G/26/_	DMD	O		R6/6R	FOWOL	
451		_/_/B/1_/15_	BCS	0	0	R2/2R	OTHER	

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
452	COF B	F/S/C/3 /22	BN FDC	C	C	V5/6V	OTHER	
453		F/W/D/3 /22M	BN FDC	D	D	V6/6V	OTHER	
454		F/O/I/27/	DMD	E		V9/9V	FOWOL	
455		F/O/K/28/	DMD	F		V0/0V	FOWOL	
456		F/O/L/29/	DMD	G		AB/BA	FOWOL	
457		_ /_ /C/1 /15	BCS	I	I	V7/7V	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
458	_ /_ /2 /15	REGT FSC	2 /3 /3 /4	I	N/A
459	_ /_ /2 /15	REGT FD	2 /3 /3 /4	E	N/A
460	_ /_ /2 /15	COF A	1 /2 /2 /3	A	N/A
461	_ /_ /2 /15	COF B	1 /2 /2 /3	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
462	REGT FSC	F/S/C/4 /MR	BN FDC	A	A	9F/F9	OTHER	
463		F/W/D/4 /MAR	BN FDC	B	B	9G/G9	OTHER	
464	REGT FD	F/W/D/2 /15	BN FDC	F	F	B5/5B	OTHER	
465		_ /_ /15/MR	BN FDC	A	A	HH/GG	OTHER	
466		F/W/D/15/MAR	BN FDC	B	B	VV/UU	OTHER	
467		_ /_ /1 /15	BN FDC	C	C	3A/A3	OTHER	
468		F/W/D/1 /15M	BN FDC	D	D	9A/A9	OTHER	
469		_ /_ /3 /15	BN FDC	G	G	B6/6B	OTHER	
470		F/W/D/3 /15M	BN FDC	H	H	B7/7B	OTHER	
471		_ /_ /5 /15	BN FDC	I	I	B8/8B	OTHER	
472		F/W/D/5 /15M	BN FDC	J	J	B9/9B	OTHER	
473		A/R/T/Y /GRP	BN FDC	K	K	GO/OG	OTHER	
474		A/R/T/Y /FWD	BN FDC	L	L	GP/PG	OTHER	
475		_ /_ /A/6 /27	MLRS	M	M	GQ/QG	OTHER	
476	COF A	F/S/C/1 /4	BN FDC	C	C	M5/5M	OTHER	
477		F/W/D/1 /4MR	BN FDC	D	D	M6/6M	OTHER	
478		F/O/A/41/	DMD	E		M9/9M	FOWOL	
479		F/O/B/42/	DMD	F		M0/0M	FOWOL	
480		F/O/C/43/	DMD	G		N1/1N	FOWOL	
481		_ /_ /E/2 /15	BCS	I	I	M7/7M	OTHER	
482		F/S/C/2 /4	BN FDC	K	K	Q0/0Q	OTHER	
483		F/W/D/2 /4MR	BN FDC	L	L	R1/1R	OTHER	
484		F/O/E/44/	DMD	M		R4/4R	FOWOL	
485		F/O/F/45/	DMD	N		R5/5R	FOWOL	
486		F/O/G/46/	DMD	O		R6/6R	FOWOL	
487		_ /_ /F/2 /15	BCS	0	0	R2/2R	OTHER	
488	COF B	F/S/C/3 /4	BN FDC	C	C	V5/6V	OTHER	
489		F/W/D/3 /4MR	BN FDC	D	D	V6/6V	OTHER	
490		F/O/I/47/	DMD	E		V9/9V	FOWOL	
491		F/O/K/48/	DMD	F		V0/0V	FOWOL	
492		F/O/L/49/	DMD	G		AB/BA	FOWOL	
493		_ /_ /G/2 /15	BCS	I	I	V7/7V	OTHER	

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LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
494	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	REGT FD	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	G	N/A
495	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	COF A	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A
496	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	COF B	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
497	REGT FD	F/W/D/3_/15M	BN FDC	H	H	C4/4C	OTHER	
498		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> /MR	BN FDC	A	A	LL/KK	OTHER	
499		F/W/D/15/MAR	BN FDC	B	B	33/44	OTHER	
500		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	C	C	5A/A5	OTHER	
501		F/W/D/1_/15M	BN FDC	D	D	1B/B1	OTHER	
502		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	E	E	6B/B6	OTHER	
503		F/W/D/2_/15M	BN FDC	F	F	0B/B0	OTHER	
504		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	I	I	C5/5C	OTHER	
505		F/W/D/5_/15M	BN FDC	J	J	C6/6C	OTHER	
506		A/R/T/Y_/GRP	BN FDC	K	K	GR/RG	OTHER	
507		A/R/T/Y_/FWD	BN FDC	L	L	GS/SG	OTHER	
508		<u>  </u> / <u>  </u> /A/6_/27	MLRS	M	M	GT/TG	OTHER	
509	COF A	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BCS	I	I	M7/7M	OTHER	
510	COF B	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BCS	I	I	V7/7V	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
511	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	REGT FD	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	I	N/A
512	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	COF A	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A
513	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	COF B	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
514	REGT FD	F/W/D/5_/15M	BN FDC	J	J	C9/9C	OTHER	
515		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> /MR	BN FDC	A	A	PP/OO	OTHER	
516		F/W/D/15/MAR	BN FDC	B	B	88/77	OTHER	
517		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	C	C	7A/A7	OTHER	
518		F/W/D/1_/15M	BN FDC	D	D	3B/B3	OTHER	
519		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	E	E	8B/B8	OTHER	
520		F/W/D/2_/15M	BN FDC	F	F	2C/C2	OTHER	
521		<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	BN FDC	G	G	5C/C5	OTHER	
522		F/W/D/3_/15M	BN FDC	H	H	7C/C7	OTHER	
523		A/R/T/Y_/GRP	BN FDC	K	K	GU/UG	OTHER	
524		A/R/T/Y_/FWD	BN FDC	L	L	GV/VG	OTHER	
525		<u>  </u> / <u>  </u> /A/6_/27	MLRS	M	M	H/I/H	OTHER	
526	COF A	<u>  </u> / <u>  </u> /R/5_/15	BCS	I	I	M7/7M	OTHER	
527	COF B	<u>  </u> / <u>  </u> /S/5_/15	BCS	I	I	R2/2R	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
528	A/R/T/Y_/GRP	REGT FSC	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	I	N/A
529	A/R/T/Y_/GRP	REGT FD	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	E	N/A
530	A/R/T/Y_/GRP	COF A	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A
531	A/R/T/Y_/GRP	COF B	<u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u> / <u>  </u>	A	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
532	REGT FSC	T/F/S/1_/MN_	BN FDC	A	A	9F/F9	OTHER	
533	REGT FD	A/R/T/Y_/FWD	BN FDC	L	L	HJ/JH	OTHER	
534		_/_/15/MR_	BN FDC	A	A	IG/GI	OTHER	
535		F/W/D/15/MAR	BN FDC	B	B	JG/GJ	OTHER	
536		_/_/11_/15_	BN FDC	C	C	LG/GL	OTHER	
537		F/W/D/1_/15M	BN FDC	D	D	HK/KH	OTHER	
538		_/_/12_/15_	BN FDC	E	E	OG/GO	OTHER	
539		F/W/D/2_/15M	BN FDC	F	F	HL/LH	OTHER	
540		_/_/13_/15_	BN FDC	G	G	RG/GR	OTHER	
541		F/W/D/3_/15M	BN FDC	H	H	HM/MH	OTHER	
542		_/_/15_/15_	BN FDC	I	I	UG/GU	OTHER	
543		F/W/D/5_/15M	BN FDC	J	J	HN/NH	OTHER	
544		_/_/A/6_/27_	MRLS	M	M	HO/OH	OTHER	
545	COF A	F/S/C/1_/29_	BN FDC	C	C	M5/5M	OTHER	
546		F/W/D/1_/29M	BN FDC	D	D	M6/6M	OTHER	
547		F/O/A/91/_	DMD	E		M9/9M	FOWOL	
548		F/O/B/92/_	DMD	F		M0/0M	FOWOL	
549		F/O/C/93/_	DMD	G		N1/1N	FOWOL	
550		_/_/K/3_/15_	BCS	I	I	M7/7M	OTHER	
551	COF B	F/S/C/6_/LA1	BN FDC	C	C	Q0/0Q	OTHER	
552		F/W/D/6_/LA1	BN FDC	D	D	R1/1R	OTHER	
553		F/O/A/61/_	DMD	E		R4/4R	FOWOL	
554		F/O/B/62/_	DMD	F		R5/5R	FOWOL	
555		F/O/C/63/_	DMD	G		R6/6R	FOWOL	
556		_/_/Q/5_/15_	BCS	I	I	R2/2R	OTHER	

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
557	_/_/A/6_/27_	REGT FD	3	M	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
558	REGT FD	_/_/15/MR_	BN FDC	A				
559		F/W/D/15/MAR	BN FDC	B				
560		_/_/11_/15_	BN FDC	C				
561		F/W/D/1_/15M	BN FDC	D				
562		_/_/12_/15_	BN FDC	E				
563		F/W/D/2_/15M	BN FDC	F				
564		_/_/13_/15_	BN FDC	G				
565		F/W/D/3_/15M	BN FDC	H				
566		_/_/15_/15_	BN FDC	I				
567		F/W/D/5_/15M	BN FDC	J				
568		A/R/T/Y_/GRP	BN FDC	K				
569		A/R/T/Y_/FWD	BN FDC	L				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
570	_/_/A/1_/15_	COF A	3	I	N/A
571	_/_/A/1_/15_	BTRY WIRE	1	I	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
572	COF A	_/_/_/1/_/15_	C	A				
573		F/W/D/1/_/15M	C	B				
574		F/S/C/1/_/22_	V	C				
575		F/W/D/1/_/22M	V	D				
576		F/O/A/21/_/	T	E				
577		F/O/B/22/_/	T	F				
578		F/O/C/23/_/	T	G				
579	BTRY WIRE	_/_/2/A/1/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
580	_/_/B/1/_/15_	COF A	3	0	N/A
581	_/_/B/1/_/15_	BTRY WIRE	1	0	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
582	COF A	_/_/_/1/_/15_	C	A				
583		F/W/D/1/_/15M	C	B				
584		F/S/C/2/_/22_	V	K				
585		F/W/D/2/_/22M	V	L				
586		F/O/E/24/_/	T	M				
587		F/O/F/25/_/	T	N				
588		F/O/G/26/_/	T	O				
589	BTRY WIRE	_/_/2/B/1/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
590	_/_/C/1/_/15_	COF B	3	I	N/A
591	_/_/C/1/_/15_	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
592	COF A	_/_/_/1/_/15_	C	A				
593		F/W/D/1/_/15M	C	B				
594		F/S/C/3/_/22_	V	C				
595		F/W/D/3/_/22M	V	D				
596		F/O/I/27/_/	T	E				
597		F/O/K/28/_/	T	F				
598		F/O/L/29/_/	T	G				
599	BTRY WIRE	_/_/2/C/1/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
600	_/_/E/2/_/15_	COF A	3	0	N/A
601	_/_/E/2/_/15_	BTRY WIRE	1	0	N/A

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LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
602	COF A	_/_/2/_/15_	C	A				
603		F/W/D/2/_/15M	C	B				
604		F/S/C/1/_/4_	V	C				
605		F/W/D/1/_/4MR	V	D				
606		F/O/A/41/_	T	E				
607		F/O/B/42/_	T	F				
608		F/O/C/43/_	T	G				
609	BTRY WIRE	_/2/E/2/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
610	_/_/F/2/_/15_	COF A	3	0	N/A
611	_/_/F/2/_/15_	BTRY WIRE	1	0	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
612	COF A	_/_/2/_/15_	C	A				
613		F/W/D/2/_/15M	C	B				
614		F/S/C/2/_/4_	V	K				
615		F/W/D/2/_/4MR	V	L				
616		F/O/A/42/_	T	M				
617		F/O/B/43/_	T	N				
618		F/O/C/44/_	T	O				
619	BTRY WIRE	_/2/F/2/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
620	_/_/G/2/_/15_	COF A	3	I	N/A
621	_/_/G/2/_/15_	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
622	COF A	_/_/2/_/15_	C	A				
623		F/W/D/2/_/15M	C	B				
624		F/S/C/3/_/4_	V	C				
625		F/W/D/3/_/4MR	V	D				
626		F/O/A/47/_	T	E				
627		F/O/B/48/_	T	F				
628		F/O/C/49/_	T	G				
629	BTRY WIRE	_/2/G/2/_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
630	_/_/I/3/_/15_	COF A	3	I	N/A
631	_/_/I/3/_/15_	BTRY WIRE	1	I	N/A

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UNCLASSIFIED

## UNCLASSIFIED

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
632	COF A	_/_/_/3_/15_	C	A				
633		F/W/D/3_/15M	C	B				
634	BTRY WIRE	_/_/2/1/3_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
635	_/_/K/3_/15_	COF A	3	I	N/A
636	_/_/K/3_/15_	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
637	COF A	A/R/T/Y_/GRP	C	A				
638		A/R/T/Y_/FWD	C	B				
639		F/S/C/1_/29_	V	C				
640		F/W/D/1_/29M	V	D				
641		F/O/A/91/_	T	E				
642		F/O/B/92/_	T	F				
643		F/O/C/93/_	T	G				
644	BTRY WIRE	_/_/2/K/3_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
645	_/_/L/3_/15_	COF B	3	I	N/A
646	_/_/L/3_/15_	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
647	COF A	_/_/_/3_/15_	C	A				
648		F/W/D/3_/15M	C	B				
649	BTRY WIRE	_/_/2/L/3_/15_	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
650	_/_/Q/5_/15_	COF B	3	I	N/A
651	_/_/Q/5_/15_	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
652	COF A	A/R/T/Y_/GRP	C	A				
653		A/R/T/Y_/FWD	C	B				
654		F/S/C/6_/LAI	V	C				
655		F/W/D/6_/LAI	V	D				
656		F/O/A/61/_	T	E				
657		F/O/B/62/_	T	F				
658		F/O/C/63/_	T	G				
659	BTRY WIRE	_/_/2/K/3_/15_	N	J				

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UNCLASSIFIED

**UNCLASSIFIED**

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
660	<u>/ /R/5_/15_</u>	COF A	3	I	N/A
661	<u>/ /R/5_/15_</u>	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
662	COF A	<u>/ / /5_/15_</u>	C	A				
663		<u>F/W/D/5_/15M</u>	C	B				
664	BTRY WIRE	<u>/2/R/5_/15_</u>	N	J				

LINE #	OWN NAME	NET	NET ACCESS	PHY ADD	MOI ADD
665	<u>/ /S/5_/15_</u>	COF B	3	I	N/A
666	<u>/ /S/5_/15_</u>	BTRY WIRE	1	I	N/A

LINE #	NET	LOGICAL NAME	DEVICE	PHY ADD	MOI ADD	SID CODE	AGENCY	MULTISUBS GROUP
667	COF A	<u>/ / /3_/15_</u>	C	A				
668		<u>F/W/D/3_/15M</u>	C	B				
669	BTRY WIRE	<u>/2/L/3_/15_</u>	N	J				

**(reverse blank)**

**C-12-J-3-20**

**UNCLASSIFIED**

## **Appendix J**

# **Continuity of Technical Fire Direction**

### **1. General**

The procedures listed in this appendix are used to ensure that a standardized, verified data base is created. Since a computer can only produce one set of data for a given set of parameters, verification of entry data is stressed vice the cross-checking of output (firing) data.

### **2. Construct Data Bases**

- a. The FDO provides known data to the FDC.
- b. The OpsChf records the known data on the record of data base. As each element is recorded, the OpsChf announces the data aloud. (The data can be printed at the BCS in place of copying by hand.)
- c. The BCS operator reads back the data as he enters it in the appropriate format.
- d. The Backup Computer System (BUCS) operator completes the appropriate field of the BUCS program and announces "check" if the entry that he heard matches the data read back, or announces "hold" if the data that he heard disagrees with the BCS operator's read back.
- e. The OpsChf will announce "correction [data]" if the data is read back incorrectly or if "hold" was announced, or he will announce "execute" if the data is correct. (The OpsChf will watch the LCU display as an additional check.)
- f. When the OpsChf commands "execute," the BCS operator will prepare to enter the next field, and the BUCS operator will select **ENDLINE**. If the last action completes the format, the BCS operator will execute.

g. The remainder of the data base will be constructed in this manner. (If time allows, a file-by-file comparison of the BUCS and BCS data base is made under the supervision of the FDO or OpsChf.)

### **3. Determine GFT Setting and Bring BUCS On-Line With BCS**

a. The OpsChf or FDO selects a gun to be used as the base piece for manual operations.

b. The BCS operator enters the base piece grid in the BCS as an observer by selecting —

**INDEX**

**1 EXECUTE**

**7 EXECUTE**

**OBS:\_\_\_;** [enter 99]

**CORD:\_\_\_\_/\_\_\_\_/\_\_\_;** [enter base piece easting/northing/altitude]

c. The horizontal control operator (HCO) plots the base piece location on the firing chart, tickmarks this as the firing unit, and constructs deflection indices.

d. The OpsChf or FDO selects the ranges and charges to be used in the determination of graphical firing table (GFT) settings and for which BUCS will be brought on-line with the BCS. The range selected should be a meteorological (met) check gauge point range. This is determined by placing the manufacturer's hairline (MHL) over the red triangles below the elevation scale of the GFT. At a minimum, a single range is selected near the center of the GFT's range span. If sufficient time is available, more ranges are selected and the process described in the following paragraph is repeated to determine multiplot GFT settings for manual backup. If a GFT is not available, table A of a tabular firing table (TFT) is entered to determine the elevation at the center of the elevation span for a chosen met line number. The corresponding range is a met check gauge point range.

e. The BCS operator makes the appropriate entries on the FM;CFF, selecting —

**INDEX****2 EXECUTE****2 EXECUTE****DIR:\_\_\_/\_\_\_;** [enter azimuth of lay in first subfield]**DIST:\_\_\_;** [enter range from paragraph 3d]**SHIFT:\_\_\_/\_\_\_/\_\_\_/\_\_\_/\_\_\_;** [enter D in fifth subfield, 20 in sixth subfield]**OBS:\_\_\_;** [enter 99]**ASF:\_\_\_/\_\_\_;** [enter HEF/TIB if GFT setting is for DPICM]**SH:\_\_\_** [enter shell for which GFT setting is being determined]**FZ:\_\_\_** [enter appropriate time fuze]**LOTS:\_\_\_/\_\_\_/\_\_\_/\_\_\_;** [enter lots chosen by the FDO]**PTF:\_\_\_;** [enter base piece gun number]**ADJ:\_\_\_;** [enter base piece gun number]**SHEAF:\_\_\_;** [enter CONV]

**NOTE:** A range in excess of 9999 meters cannot be entered in the **DIST** field. Distances in excess of 9999 meters must be entered in two steps. First make the appropriate entries in the **FM;CFF** using a distance of **9999** and execute. Ignore the resulting firing data. Process a **FM;SUBS** with the **TGT** field and the remainder of the desired range as an add correction in the **SHIFT** field.

f. The BCS operator executes and then records the firing data.

g. The BCS operator returns to the related message and records the **CORD** field grid and altitude.

h. The BCS operator announces the data: **GUN** [number], **LOT** [lot designators], **CHG** [number], **TI** [fuze setting], **DF** [value], **QE** [value].

- i. The BUCS operator makes the following appropriate entries in the BUCS:

MAIN INDEX

1 ENDLINE

6 ENDLINE

EAST:\_\_\_\_\_ [enter easting from paragraph 3g]

NORTH:\_\_\_\_\_ [enter northing from paragraph 3g]

ALT:\_\_\_\_\_ [enter altitude from paragraph 3g]

PROJ:\_\_\_\_\_ [enter shell for which the BCU computed data]

LOT:\_\_\_\_\_ [enter lot for which the BCU computed]

FUZE:\_\_\_\_\_ [enter fuze for which the BCU computed]

REG PIECE:\_\_\_\_\_ [enter base piece gun number]

CHARGE:\_\_\_\_\_ [ensure that charge to be brought on line is displayed;  
change charge selected by BUCS as required]

- j. Data is displayed. Ignore this data. The BUCS operator enters the data, reading back that data at each step. Upon hearing the correct read-back, the OpsChf/FDO will announce "check." The BUCS operator will then select **ENDLINE** and make the following entries:

BCS TI:\_\_\_\_\_ [enter time computed by BCS]

BCS DF:\_\_\_\_\_ [enter deflection computed by BCS]

BCS QE:\_\_\_\_\_ [enter QE computed by BCS]

- k. The BUCS computes residuals. When residuals are displayed by the BUCS, the BUCS operator announces each residual.

- l. The OpsChf reads back and records the residuals.

- m. The OpsChf/FDO examines the residuals and directs the BUCS operator to store them and end the mission if they are judged correct.

- n. The recorder determines a GFT setting from the BCS data determined in paragraph 3h.

- o. The QE determined is the GFT setting elevation.

- p. The time determined is the GFT setting time.

- q. The total deflection (DF) correction is determined by the formula:

$$\text{BCS DF}-\text{Common DF}=\text{Total DF Correction}$$

- r. Drift is determined by placing the MHL of the GFT over the elevation from paragraph 3f. Read drift from the MHL.

- s. GFT deflection correction is determined by the formula:

$$\text{Total DF Correction}-\text{Drift}@ \text{Adjusted Elevation}=\text{GFT DF Correction}$$

- t. The chart range is the polar plot range entered to determine the GFT setting.

#### **4. Determine Terrain Gun Position Corrections**

- a. The BCU operator will process a dry-fire subsequent correction to the fire mission established in paragraph 3f by making the following entries:

**INDEX**

**2 EXECUTE**

**3 EXECUTE**

**TGT:\_\_\_\_\_;** [enter target number]

**CONT:\_\_\_/\_\_\_;** [enter FFE in second subfield]

**PTF:\_\_\_\_\_;** [enter BTRY]

**EXECUTE**

- b. The BCS operator announces the firing data to the OpsChf.
- c. The OpsChf records and reads back the data.
- d. The OpsChf computes terrain gun position corrections (TGPCs) with the following formulas:

$$\text{Gun \#} \_\_ \text{ Time-Base Piece Time}=\text{Gun \#} \_\_ \text{ Time Correction}$$

$$\text{Gun \#} \_\_ \text{ DF-Base Piece DF}=\text{Gun \#} \_\_ \text{ DF Correction}$$

$$\text{Gun \#} \_\_ \text{ QE-Base Piece QE}=\text{Gun \#} \_\_ \text{ QE Correction}$$

- e. The TGPCs for the remaining pieces are then computed.
- f. The corrections are announced to the guns to allow the FDC to send one set (base piece) of firing data and still fire a battery special sheaf. The TGPCs are valid 2000 meters over and short of the center of sector range and 400 mils left and right of the center deflection.
- g. The LCU operator displays a blank **FM;SUBS** and enters **EOM:X;** and **RAT:T;** messages.

## **Appendix K**

### **Fire Mission Logs**

#### **1. Instructions for Completing the FSCC Mission Log**

The fire mission log (figure K-1) is used by the FSCC to track fire missions received at the LCU. Each line of the form is used for a single mission. The columns are completed as follows:

**a. Column 1 — TGT NUMBER**

Enter the target number of the received mission.

**b. Column 2 — EAST**

Enter easting coordinates of the mission target.

**c. Column 3 — NORTH**

Enter the northing coordinates of the mission target.

**d. Column 4 — FO**

Enter the observer number of the observer requesting fires.

**e. Column 5 — CLRD**

Enter "C" for cleared or "D" for denied followed by the time of decision.

**f. Column 6 — FIRE SUPPORT MEANS ASSIGNED**

Enter the fire support means assigned; e.g., "ARTY," "NGF," "AIR," "MORT."

**g. Column 7 — REQ CLRD AGENCY**

If the mission must be cleared by another FSCC, enter that agency's tag name.

**h. Column 8 — REQ CLRD TIME**

If the mission must be cleared by another FSCC, enter the time clearance was requested.

**i. Column 9 — XMIT TO BN FDC TIME**

Enter the time the cleared mission was transmitted to the battalion FDC.

**j. Column 10 — EOM TIME**

Enter the time "end of mission" was received.

**k. Column 11 — DISPOSITION**

Enter the disposition of the target as received on the FM;SUBS.



## 2. Instructions for Completing the FDC Mission Log

The fire mission log (figure K-2) is used by the FDC to track fire missions received at the LCU. This is not a complete record. The FDC should print the **MISSION FIRED FILE** for a record of targets engaged. This record is an aid to maintaining control of operations. Each line of the form is used for a single mission or correction. The columns are completed as follows:

**a. Column 1 — TGT NUMBER**

Enter the target number of the received mission or correction.

**b. Column 2 — EAST**

Enter easting coordinates of the mission target or subsequent correction.

**c. Column 3 — NORTH**

Enter the northing coordinates of the mission target or subsequent correction.

**d. Column 4 — ALT**

Enter the plotted altitude of the mission target.

**e. Column 5 — FO**

Enter the observer number of the observer requesting fires.

**f. Column 6 — CLRD**

Enter "C" for cleared or "D" for denied, followed by the time of decision, or enter "EOM" and time when mission is ended.

**g. Column 7 — REQ CLRD AGENCY**

If the mission must be cleared by another FSCC, enter that agency's tag name.

**h. Column 8 — REQ CLRD TIME**

If the mission must be cleared by another FSCC, enter the time clearance was requested.

**i. Column 9 — XMIT TO BTRY TIME**

Enter the time the cleared mission was transmitted to the battery FDC.

**j. Column 10 — SHOT TIME**

Enter the time "shot" was received from each battery; e.g., A-1305, B-1306, C-1305.

**k. Column 11 — ROUNDS CMPLT TIME**

Enter the time "rounds complete" was received from each battery; e.g., A-1307, B-1308, C-1307.

**l.** Each line will be entered in the order missions and corrections are received without attempting to keep all corrections for a mission together on the log.



## Appendix L

### Glossary

#### A

AAV	assault amphibious vehicle
ACA; ACA	airspace coordination area
ACK	acknowledge
ADAM	area denial artillery munition
ADDR	address, addressee
ADJ	adjust, adjustment
ADP	automated data processing
AFATDS	advanced field artillery tactical data system
AFU	artillery fire unit
AGSM	Army ground station module
alt	alternate; altitude
ALT	altitude
AMC	at my command
ammo; AMMO	ammunition
AMOE	ammunition expended
AMOH	ammunition on hand
AMOL	ammunition level
AMOR	ammunition received
ANGLET	angle T
AO; AO	aerial observer
AP	additional points
APICM	antipersonnel improved conventional munition
APL	applicable ammunition
arty; ARTY	artillery
ASE	air support element
ASF	adjusting shell-fuze
ASR	available supply rate
ATACMS	Army tactical missile system
ATHS	airborne target handover system
ATI	artillery target intelligence
ATIZ	artillery target intelligence zone
ATK	attack
ATT	attitude
AUF	adjusting unit
AUTO	automatic

AZ ..... azimuth  
 AZR ..... azimuth-distance report

## B

BCS ..... battery computer system  
 BCT ..... battlefield computer terminal  
 BD ..... battle damage  
 BGEOM ..... battlefield geometry  
 BLT ..... battalion landing team  
 bn; BN ..... battalion  
 Bn FD Net ..... battalion fire direction net  
 BOC ..... battery operations center  
 bps ..... bits per second  
 btry; BTRY ..... battery  
 BUCS ..... backup computer system

## C

C ..... confidential  
 CAS ..... close air support  
 CAS ..... casualty  
 CAV ..... communications authenticator variable  
 CBR ..... counterbattery radar  
 CBTI ..... combat information  
 CC ..... communications check  
 C<sup>c</sup>C ..... confidential crypto  
 CDR ..... coordinate report  
 CF ..... counterfire  
 CFF ..... call for fire  
 CFFO ..... call for fire order  
 CFFZ ..... call for fire zone  
 CFL; CFL ..... coordinated fire line  
 CFR ..... confidential formerly restricted  
 CFZ ..... critical friendly zone  
 CHA ..... chemical hazard area  
 CHEM ..... chemical  
 CHG ..... charge  
 CM ..... computer met  
 CMR ..... countermortar radar  
 CNO ..... cannot observe

COF	conduct of fire net
COMD	command
COMFP	compute fire plan
comm	communications
COMSEC	communications security
CONT	control
CONV	converged
COORD	coordination
CORD	coordinates
CORR	correction
CP	command post
CPRHD	Copperhead
CRG	counterfire reference grid
CRIT	critical
crypto; CRYPTO	cryptological
CSR	controlled supply rate
CTS	cosmic top secret
CZ	censor zone

## D

D	data
D	down
DASC	direct air support center
DC	danger close
DD	division damage
DES	destruction mission
DEST	destroyed
df; DF	deflection
DIR	direction
DIS; DIST	distance
DISP	disposition
div	division
Div FSC Net	division fire support coordination net
DMD	digital message device
DMS	AN/PSC-2A digital message system
DNA	do not adjust
DNARV	do not adjust report value
DNC	do not combine
DNL	do not load
DNO	did not observe

DOP ..... degree of protection  
 DPICM ..... dual purpose improved conventional munition  
 DPMOD ..... data print modification  
 DS ..... direct support  
 DSA ..... dead space area  
 DSCP ..... dual station command post  
 DTG ..... date-time group

## E

ECOF ..... effects cutoff factor  
 EDC ..... error detection and correction  
 EDTG ..... effective date-time group  
 EFF ..... effects  
 EFFCY ..... efficiency  
 EOM ..... end of mission  
 ETO ..... encrypt for transmission only  
 EXECFP ..... execute fire plan

## F

FADAC ..... M18 field artillery digital automated computer  
 FASCAM ..... family of scatterable mines  
 FCTN ..... function  
 FD ..... fire direction  
 FDC ..... fire direction center  
 FDO ..... fire direction officer  
 FDS ..... fire direction system  
 FFA; FFA ..... free fire area  
 FFC ..... force fires coordinator  
 FFCC ..... force fires coordination center  
 FFE; FFE ..... fire for effect  
 FISTDMD ..... fire support team digital message device  
 FLOT; FLOT ..... forward line of own troops  
 FM ..... frequency modulation; U.S. Army field manual  
 FM ..... fire mission  
 FMFM ..... Fleet Marine Force manual  
 FM MOD ..... fire mission modification  
 FO; FO ..... forward observer  
 FOCMD ..... FO command  
 FOWOL ..... forward observer without laser

FP	fire plan
FPA	fire plan alteration
FPAMMO	fire plan ammunition report
FPF; FPF	final protective fires
FPLST	fire plan preliminary target list
FPSUM	fire plan summary report
FPTGT	fire plan target list
FPTU	fire planning target update
FR	fire request
FSC	fire support coordinator
FSCC	fire support coordination center
FSCL; FSCL	fire support coordination line
FSCM	fire support coordination measure
FSCoord	fire support coordinator
FSE	fire support element
FSK; FSK	frequency shift keying
FSP	force supported
FU	fire unit
FUSEL	fire unit selection
fwd	forward
FZ	fuze

## G

GCE	ground combat element
GDU	gun display unit
GEOM	geometry
GFT	graphical firing table
GLLDCO	ground laser locator designator code
GRP	group
GS	general support
GS-R	general support-reinforcing
GT	gun-target
GZ	grid zone

## H

HB	high burst
HCO	horizontal chart operator
HE; HE	high explosive
HF	high frequency

HOB ..... height of burst  
HPT ..... high payoff target  
HPTL ..... high payoff target list

**I**

ICM ..... improved conventional munition  
ID ..... identify; identification  
I/E ..... in effect  
IFSAS ..... initial fire support automated system  
IGAMMO ..... ignore ammunition  
ILL ..... illumination  
inf ..... infantry  
INIT ..... initialization  
INST ..... instructions  
ITS ..... individual training standard

**J**

JMEM ..... joint munitions effectiveness manual  
JSTARS ..... joint surveillance target attack radar system

**K**

KNPT ..... known point

**L**

LAR ..... light armored reconnaissance  
LCU ..... AN/GYK-37 lightweight computer unit  
LFSZ ..... laid FASCAM safety zone  
LGSB ..... legal subscriber  
LIN ..... linear  
LnChf ..... liaison chief  
LnO ..... liaison officer  
LRRP ..... long-range reconnaissance patrol  
LTACFIRE ..... light tactical fire direction system

## M

MAGTF	Marine air-ground task force
MAJORX	semi-major axis
MAP MOD	map modification
MAT	materiel
MAX	maximum
MAXEL	maximum elevation
MAXRNG	maximum range
MAXRTE	maximum rate
MAXVOL	maximum volley
MCFSS	Marine Corps fire support system
MDS	AN/TMQ-4 meteorological data system
ME	method of engagement
MEF	Marine expeditionary force
MEF(F)	Marine expeditionary force (forward)
MEF FFC Net	MEF force fires coordination net
met; MET	meteorological
Met/Rdr Tel Net	meteorological data/radar telling net
MEU	Marine expeditionary unit
MF	method of fire
MFR	mission fired report
MHL	manufacturer's hairline
MIL	military
MIN	minimum
MINORX	semi-minor axis
MINRNG	minimum range
MIS	mission
MLF	maximum limiting factor
MLRS	multiple launch rocket system
MMS	meteorological measuring system
MOD	modification
MOD FILE	modification file
MOI	message of interest
MPI	mean point of impact
MSG	message
MSL	mean sea level
MSN	mission
MTO	message to observer
MVTGT	moving target
MVV	muzzle velocity variant

## N

NAK	negative acknowledgement
NC	NATO confidential
NCS	net control station
NEUT	neutralized
NFA; NFA	no fire area
NLT	no later than
NNFP	nonnuclear fire planning
NS	NATO secret
NSFS	naval surface fire support
NUC; NUKE	nuclear

## O

OBCO	observer location
obj	objective
OBS; OBSR	observer
ONC	on-call
ONCALL	on-call target list
OP	observation post
OpsChf	operations chief
ORD	ordnance
OS	orienting station
OT	observer-target

## P

PCLD; PCLD	priority, classification, logging, and display
PERS	personnel
PFSZ	primary FASCAM safety zone
PG	page
PL	phase line
PREFP	prepare fire plan
PRES	pressure
PRF	pulse repetition frequency
PRI	priority
PROP	propellant
PT	plain text
PTEMP	powder temperature
PTF	pieces to fire
PTM	plain text message

PZ ..... primary zone

## Q

Q ..... tactical factor  
Q-36 ..... AN/TPQ-36 firefinder radar  
QE; QE ..... quadrant elevation  
QF ..... quick response fire  
QMOD ..... tactical factor modification

## R

R ..... reinforcing  
RAAM ..... remote antiarmor munition  
RAD ..... radius  
RAOC ..... rear area operations center  
RAP ..... rocket assisted projectile  
RDCOMP ..... rounds complete  
RECALC ..... recalculate  
REG ..... registering  
regt ..... regiment  
Regt FD Net ..... regimental fire direction net  
Regt FSC Net ..... regimental fire support coordination net  
REL ..... reliability  
RESFU ..... reserve fire unit  
RFA; RFA ..... restricted fire area  
RFAF ..... request for additional fire  
RFL; RFL ..... restricted fire line  
RG ..... range  
RPF ..... relative proximity factor  
RS ..... radiation status  
RT ..... reaction time  
RV ..... report value

## S

S ..... secret  
SACC ..... supporting arms coordination center  
SB ..... subscriber  
SBT ..... subscriber table  
S\*C ..... secret crypto

---

SCDFIRE	.....	schedule of fires report
SCP	.....	survey control point
SCPST	.....	survey control point storage
SEL	.....	select
SER	.....	serial
SFR	.....	secret formerly restricted
SH	.....	shell
SHELREP	.....	shelling report
SHFCOR	.....	shift correction
SID	.....	subscriber identification code
SINGGARS	.....	single channel ground and airborne radio system
SITREP	.....	situation report
SKED	.....	schedule
SMK	.....	smoke
SNF	.....	secret no foreign dissemination
SOP	.....	standing operating procedure
SPD	.....	speed
SPINT	.....	special instructions
SPR	.....	salvage point recording
SPRT	.....	support
SRCH	.....	search
SRD	.....	secret restricted data
SRI	.....	standing request for information
SSCP	.....	single station command post
STANAG	.....	standard agreement
STAT	.....	status
STDMET	.....	standard meteorological data
STR	.....	strength
SUBS	.....	subsequent
SVF	.....	standard volley factor
SVL	.....	surveillance
SVMOD	.....	standard value modification
SYNC	.....	synchronization
SYS	.....	system

## T

TACFIRE	.....	tactical fire direction system
TARBUL	.....	target bulletin
TBMOD	.....	target buildup modification file
TCRIT	.....	targeting criteria

TDA	target damage assessment
TEMP	temperature
TFT	tabular firing table
TGPC	terrain gun position correction
TGR	target report
TGT	target
THM	thermal homing munition
TI	time
TIMEX	maximum target age
TIMEY	maximum time difference
TISF	targets in the schedule of fires
TM	technical manual
TOT; TOT	time on target
TPAC	trigonometric point access
TPC	target processing center
TRAVLR	traverse left and right
TS	top secret
TVA	target value analysis
TVAREA	target value area

## U

U	up
UAV	unmanned aerial vehicle
UFFE; UFFES	units to fire for effect
UN	unclassified
UNK	unknown
UREINF	unit reinforced
UTM	universal transverse mercator

## V

V	voice
VERT	vertical
VISIB	visibility
VOL	volley(s)
VSF	volley size factor

**W**

WDOP ..... weighted degree of protection  
WP ..... white phosphorus  
WPN ..... weapon  
WR ..... when ready  
WSIZE ..... weighted size  
WSTR ..... weapon strength  
WTYP ..... weighted type

**X**

XCLUDE ..... exclude  
XMIT ..... transmit  
XSCD ..... scheduling instructions for XTGT  
XTGT ..... target to be transmitted

**Z**

ZF ..... zone fire  
ZONE ..... zone

## Appendix M

### References and Related Publications

#### 1. Joint Publications

Joint Pub 1-02      *Department of Defense Dictionary of Military  
and Associated Terms*

#### 2. Fleet Marine Force Manuals

FMFM 1-7/NWP 22-2	<i>Supporting Arms in Amphibious Operations</i>
FMFM 2-7	<i>Fire Support in MAGTF Operations</i>
FMFM 2-7-1	<i>Fire Support Coordination by the MAGTF Command Element</i>
FMFM 3	<i>Command and Control</i>
FMFM 3-1	<i>Command and Staff Action</i>
FMFM 3-30	<i>Communications</i>
FMFM 5-40	<i>Offensive Air Support</i>
FMFM 5-41	<i>Close Air Support and Close-in Fire Support</i>
FMFM 6	<i>Ground Combat Operations (under development)</i>
FMFM 6-8	<i>Supporting Arms Observer, Spotter, and Controller</i>
FMFM 6-9	<i>Marine Artillery Support</i>
FMFM 6-18	<i>Techniques and Procedures for Fire Support Coordination</i>
FMFM 6-18-2	<i>Commander's Guide for the MCFSS (under development)</i>
FMFM 6-22/TC 6-40	<i>Field Artillery Manual Cannon Gunnery</i>
FMFM 6-23/TC 6-40A	<i>Field Artillery Automated Cannon Gunnery</i>

**3. Fleet Marine Force Reference Publications/U.S. Army Field Manuals** (To be dual designated as FM/FMFRP upon revision. Publications not currently at MCLB Albany may be ordered from Commandant, USAFAS, Attn: ATSF-DD, Fort Sill, OK 73503-5600.)

FMFRP 6-6-2/FM 6-2	<i>Field Artillery Survey</i>
FMFRP 6-6-15/ FM 6-15	<i>Field Artillery Meteorology</i>
FMFRP 6-6-20/ FM 6-20	<i>Fire Support in Airland Operations</i>
FMFRP 6-6-20-1/ FM 6-20-1	<i>Field Artillery Cannon Battalion</i>
FMFRP 6-6-20-10/ FM 6-20-10	<i>Tactics, Techniques, and Procedures for the Targeting Process</i>
FMFRP 6-6-20-30/ FM 6-20-30	<i>Tactics, Techniques, and Procedures for Fire Support for Corps and Division Operations</i>
FMFRP 6-6-20-40/ FM 6-20-40	<i>Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Heavy)</i>
FMFRP 6-6-20-50/ FM 6-20-50	<i>Tactics, Techniques, and Procedures for Fire Support for Brigade Operations (Light)</i>
FMFRP 6-6-30/ FM 6-30	<i>Observed Fire Procedures</i>
FMFRP 6-6-50/ FM 6-50	<i>Field Artillery Cannon Battery</i>
FMFRP 6-6-60/ FM 6-60	<i>Multiple Launch Rocket System (MLRS)</i>
FMFRP 6-6-121/ FM 6-121	<i>Field Artillery Target Acquisition</i>

**4. Joint Munitions Effectiveness Manuals**

Joint Munitions Effectiveness Manuals (JMEMs) are in the FMFM 4-7 series and are classified. FSCs should already have access to the JMEMs for the weapons to be used.

**5. U.S. Marine Corps Technical Manuals**

TM 08625A-10/1-1&2    *Meteorological Data System AN/TMQ-31*  
TM 2000-12/3            *Operator's Job Aids for the Battlefield*  
                                 *Computer Terminal V9.57*

**6. U.S. Army Technical Manuals**

TM 11-7440-253-10    *Operator's Manual for Message Entry Device,*  
                                 *Variable Format, AN/GSC-21 (VFMED)*  
TM 11-5840-354-10    *Operator's Manual for Radar Sets*  
                                 *AN/TPQ-36(V)3*

**7. U.S. Army Field Artillery School Special Texts**

(Order from Commandant, USAFAS, Attn: ATSF-DD, Fort Sill, OK  
73503-5600.)

ST 6-1-1                *LTACFIRE Operations*  
ST 6-3                  *Advanced Field Artillery Tactical Data System*  
                                 *(AFATDS) Operations (under development)*  
ST 6-40-2               *Field Artillery Battery Computer System*  
                                 *Cannon Gunnery Version 10 (under*  
                                 *development)*  
ST 6-40-30              *Battery Computer System Job Aids*  
ST 6-40-31              *Field Artillery Backup Computer System*  
                                 *(BUCS) Special Text*